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SIXTH REPORT OF THE INTERNATIONAL CLEARINGHOUSE ON SCIENCE AND MATHEMATICS CURRICULAR DEVELOPMENTS 1968.

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AMERICAN ASSN. FOR THE ADVANCEMENT OF SCIENCE

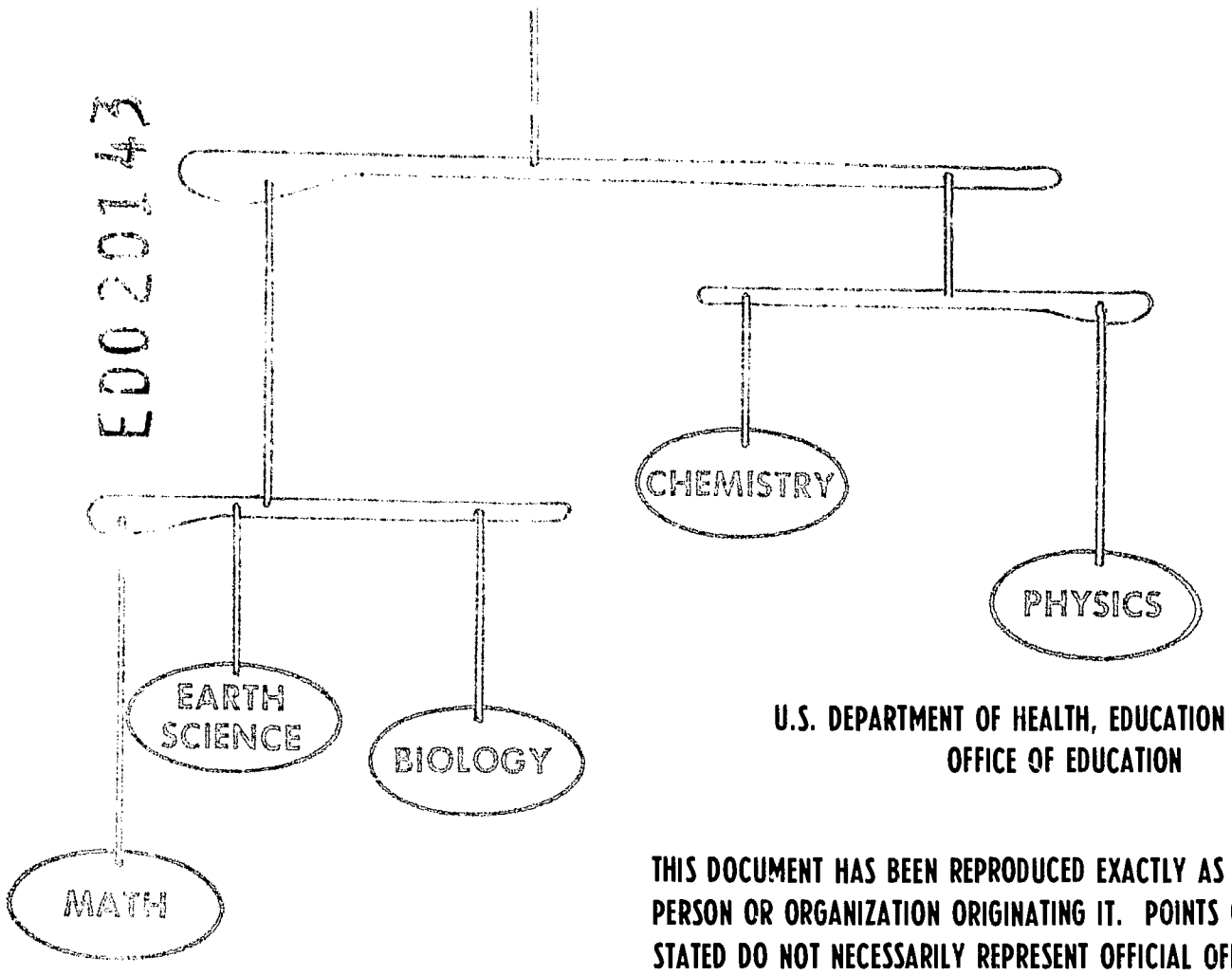
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REPORTED IS INFORMATION CONCERNING CURRENT PROJECT GROUPS THAT ARE DEVELOPING SCIENCE AND MATHEMATICS CURRICULAR MATERIALS. PROJECTS FROM THE UNITED STATES AND MORE THAN 40 OTHER COUNTRIES ARE INCLUDED. EACH PROJECT IS LISTED SEPARATELY. INFORMATION FOR EACH PROJECT INCLUDES (1) TITLE, (2) PRINCIPAL ORIGINATORS, (3) PROJECT DIRECTOR, (4) ADDRESS OF THE PROJECT HEADQUARTERS, (5) PROFESSIONAL STAFF, (6) PROJECT SUPPORT, (7) PURPOSES AND OBJECTIVES, (8) SPECIFIC SUBJECT AND GRADE LEVEL, (9) MATERIALS THAT HAVE BEEN PRODUCED, (10) HOW PROJECT MATERIALS ARE BEING USED, (11) LANGUAGE IN WHICH MATERIALS HAVE BEEN WRITTEN, (12) LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATIONS, (13) ADDITIONAL MATERIALS PRESENTLY BEING DEVELOPED, (14) MATERIALS AVAILABLE FREE, (15) PURCHASABLE MATERIALS, (16) SPECIFIC PLANS FOR EVALUATION OF MATERIALS, (17) SPECIFIC PLANS FOR TEACHER PREPARATION, AND (18) FUTURE PLANS. A SEPARATE SECTION LISTS PROJECTS WHICH HAVE INDICATED COMPLETION OF THEIR WORK OR PROJECTS WHICH ARE INACTIVE AT PRESENT. THIS DOCUMENT IS AVAILABLE AT NO COST FROM THE UNIVERSITY OF MARYLAND, SCIENCE TEACHING CENTER, COLLEGE PARK, MARYLAND. (DS)

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EDITED UNDER
THE DIRECTION OF
J. DAVID LOCKARD

SE 004 735

A Joint Project of the

Commission on Science Education
American Association for the Advancement of Science

Science Teaching Center
University of Maryland

SIXTH REPORT OF THE

INTERNATIONAL CLEARINGHOUSE

ON

SCIENCE AND MATHEMATICS CURRICULAR DEVELOPMENTS

1968

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INTRODUCTION TO THE SIXTH REPORT OF THE INTERNATIONAL CLEARINGHOUSE

This volume is the sixth in a series of annual reports of The nternational Clearinghouse on Science and Mathematics Curricular)evelopments. Its purpose is to furnish answers to the questions ıost often asked about the science and mathematics curriculum pro- jects that are being developed around the world. It is one of the ways the Clearinghouse fulfills its role of promoting better science and mathematics teaching. The information is gathered together mainly by replies to the questionnaire sent annually to the project directors. This year's questionnaire was much more detailed than earlier ones and asked more specific questions. One of the areas that seems to be developing rapidly is that of curriculum evaluation and thus we have asked several new questions on that particular topic. The reports are in the words of the project directors themselves and only minor editing is done at the International Clearinghouse headquarters. If you desire additional information which is not in this report you are encouraged to contact the project directors at the addresses indicated in their section.

The International Clearinghouse was established at the University of Maryland's Science Teaching Center in the Fall of 1962 and its first report was released in the Spring of 1963. Unfortunately, the supply of that and all earlier reports has already been exhausted. During the first years of the Clearinghouse's operation it was known as the Information Clearinghouse and was established through a National Science Foundation grant to the University of Maryland's Science Teaching Center through the American Association for the Advancement of Science. For the first few years it concerned itself mainly with projects of an ongoing nature in the United States. In the Spring of 1965, while in Europe to present a paper at an International Scientific Symposium, this director was invited to UNESCO Headquarters in Paris to meet with Dr. Albert Baez, who at that time was on their science education staff. During that meeting and subsequent ones both there and in America, the Information Clearinghouse was invited to become internationalized with the encouragement and support of UNESCO. During the Summer of 1965, Dr. Baez and this director met with representatives of the National Science Foundation and the American Association for the Advancement of Science. The result was the expansion into The International Clearinghouse operation. Financial support still comes mainly from the National Science Foundation and the University of Maryland with advisory help from UNESCO Headquarters in Paris and other organizations throughout the world. This sixth report is our most extensive in size and scope and it is truly international as can be seen by reading through the numerous indices.

In addition to the condensed information which is supplied by means of this report, we do maintain at The International Clearinghouse, a collection of the written materials and some of the equipment

that the projects have produced. It is probably the most comprehen such collection in the world and the numerous contributions from th various projects are greatly appreciated.

If you are in the Washington, D.C. area, you are encouraged to visit the Center and its International Clearinghouse. We are just eight miles from downtown Washington, D.C. and are easily accessibl by car, taxi, and buses. Airports serving the University include Washington National and Baltimore's Friendship, both of which are ju one-half hour away. We are located two blocks from the University's Adult Education Center where hotel accommodations are available. Since there have been so many questions raised about the total progr of the Science Teaching Center there is a brief description on page of some of our other activities that you might find of interest if you were to visit us.

Over the seven years of operation of the Clearinghouse a number of curriculum projects have completed their original work. For that reason this annual report includes a special section of the projects that have indicated to us that their work is complete or at least inactive at this time. If you do not know about their earlier activities and desire more information you should contact the individuals listed with their project name or read copies of our earlier reports. Although we do maintain a master set of materials at the Clearinghouse we do not have these in sufficient quantity to furnish copies of such materials to individuals. If you desire to receive personal copies of specific items,you should contact the project directors or their publishers as listed in their section of the report.

We certainly want to thank all those who have contributed in any way to the success and value of this publication and the work of The International Clearinghouse on the University of Maryland campus. We are constantly striving to locate, identify and receive information from projects throughout the world. We encourage any of our readers at any time to forward information concerning names and addresses of un-noted project directors. It may be that for some reason we have not been able to make the proper contacts or have been asked not to include a particular item at this time.

No report as detailed as this could be produced without the contributions of literally hundreds of individuals. We gratefully acknowledge the splendid cooperation of the project directors and their staff members and appreciate very much the materials they have furnished to The International Clearinghouse for your use. Other major contributors to our activities would include those on the staffs of the American Association for the Advancement of Science, the International and the Course Content Improvement Sections of the National Science Foundation, the United States Office of Education, the President's Office of Science and Technology, the United States State Department, the Organization for Economic Cooperation and Development, the Pan-American Union, many foreign embassies, and the

aff at UNESCO in Paris.

In the final analysis, however, a few individuals finally put a iblication into print. The research assistant on this project who as contributed unstintingly to the work is Maria Penny. She not ily carried the major burden of this sixth report but also maintains ne materials collection. Assisting her have been Mary Blatt Harbeck nd two of our Science Teaching Center secretaries, Sharon Dorman nd Nelda Young who also typed the rough and final copy. I am reatly indebted to all four of them for their fine help and their ajor contributions to this activity. Any credit for the value of his 1968 report should go to them. Any criticisms and constructive uggestions should come to the Clearinghouse Director. In addition ince The International Clearinghouse is only a part of our Science eaching Center activities, we are indebted to our Center colleagues ho interact constantly with this project and frequently host the isitors. These fellow staff members include Rolland Bartholomew, Glenn Blough, James Collier, Philip DiLavore, George Eley, Marjorie Gardner, Mary Ann Hagan, Charles LaRue, Marlene Murray, Herman Ruoff, William Talbott and David Williams. Without the combined help of all these individuals, our Center operation could not be the success it is.

Single copies of the 1968 report will be furnished free to individuals as long as the supply lasts. Supplying us with 25 cents in coin or stamps to cover the mailing costs does help us serve more individuals. Such requests should be addressed to Dr. J. David Lockard, Director, International Clearinghouse on Science and Mathematics Curricular Developments, Science Teaching Center, University of Maryland, College Park, Maryland 20742, United States of America.

College Park, Maryland
May 1968

J. David Lockard, Director
The International Clearinghouse

THE UNIVERSITY OF MARYLAND SCIENCE TEACHING CENTER

The International Clearinghouse is located in the University of Maryland Science Teaching Center at College Park, Maryland. Designed to serve as a representative facility of its type, the functions of the Science Teaching Center include teacher and supervisor training, graduate education, basic research in science education, and consultative services. In addition to the Clearinghouse activites, the Center staff reviews and displays the latest in science teaching materials for the National Science Teachers Association. The reviews are published each month in the Association's two journals, The Science Teacher and Science and Children.

The numerous and varied activities of the Science Teaching Center have resulted in a generous and advantageous expansion of facilities. With the new additions nearing completion, the Center will have two modern, classroom-type science laboratories with adjacent demonstration preparation areas and storage areas. Conference facilities will be available for both large and small groups. An expanded library will feature relevant periodicals, science textbooks, new curriculum materials and works on science pedagogy and its operational aspects. A fully equipped research laboratory will provide project space for both faculty and students. In addition to the complete photographic and audio-visual facilities already available, the Center will feature some of the latest technological developments in science education, including closed circuit television, a sample audio-tutorial set-up and provision for eventual connection to a computer facility. The International Clearinghouse occupies another expanded area adjacent to the Center library. On file here are the latest materials from both national and international science and mathematics curriculum projects. Every attempt is made to keep the collection as comprehensive as possible and it is believed to be one of the most up-to-date collections of such materials in the world.

Each year the Science Teaching Center is host to large numbers of domestic and foreign visitors. Its close proximity to Washington, D.C., and the leading science and educational organizations of the country serves to stimulate such visits while insuring valuable cooperative links for the advancement of science education. Since it is a basic aim of the Clearinghouse to promote international cooperation through the dissemination of information, the Center shall continue to welcome and to aid visitors of every nation in all areas and at all levels of science and mathematics education.

To arrange a visit or to obtain additional information, please contact Dr. J. David Lockard, Director, Science Teaching Center, University of Maryland, College Park, Md. 20742. Tel. 301-454-4028.

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Projects Listed Alphabetically by Geographical
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A. PROJECT TITLE: AFRICAN MATHEMATICS PROGRAM.

B. PROJECT DIRECTOR: Mr. Hugh P. Bradley, African Mathematics Program, Education Development Center, 55 Chapel Street, Newton, Massachusetts 02160. Tel. 617-969-7100.

C. PROJECT HEADQUARTERS:
1. Contact: Mr. Hugh P. Bradley, African Mathematics Program.
2. Special facilities or activities available for visitor viewing: Copies of materials; literature about the program.

D. PRINCIPAL PROFESSIONAL STAFF: The African Mathematics Program employs, on a consulting basis, a staff of African and American mathematicians at Workshops each summer in Africa to develop mathematics course materials. Some of these people also lecture in institutes to train African teachers to use the new materials. The activities are carried out under the direction of a Steering Committee of African and American members. The Executive Committee consists of R.P. Dilworth, California Institute of Technology; W.T. Martin, M.I.T. (Chairman); C. Modu, West African Examinations Council, Lagos, Nigeria; W. Prenowitz, Brooklyn College; Onyerisara Ukeje, Univ. of Nigeria, Nsukka, E. Nigeria; Awadagin Williams, Fourah Bay College, Sierra Leone.

E. PROJECT SUPPORT:
1. Organizational sponsorship: Education Development Center.
2. Funding agency: United States Agency for International Development (US/AID); Ford Foundation.

F. PROJECT HISTORY:
1. Principal originators: Professor J.R. Zacharias, M.I.T.; Professor W.T. Martin, M.I.T.
2. Date and place of initiation: 1961; Cambridge, Massachusetts.
3. Reason for initiation: To develop a modern mathematics program from Standard I to School Certificate for English-speaking African countries.

G. PRESENT COMMERCIAL AFFILIATIONS: Science Research Associates, Chicago, Illinois; Science Research Associates Ltd., England.

H. PURPOSES AND OBJECTIVES: Following a conference attended by African, American and British educators in 1961, it was decided to initiate curriculum reform programs for Africa. In particular, programs in mathematics, science, social studies and teacher training were recommended. It was felt that the work of curriculum reform in mathematics in the U.S.A. and in Britain was sufficiently advanced to make possible a positive contribution to African education; thus a program for the reform of the teaching of mathematics from Standard I up to School Certificate was undertaken. It is the aim of the program to produce new mathematics material in the following four areas: text materials for primary school; text materials for secondary school; text materials for African teacher training colleges; and tests and examinations

based on these materials.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Lectures.

J. ORIENTATIONS OF STATED OBJECTIVES: Content mastery, attitudinal changes, scientific literacy, class participation.

K. LOCATION OF LIST OF OBJECTIVES: Text introductions.

L. SPECIFIC SUBJECTS, GRADE AND AGE LEVELS: Mathematics: primary, secondary, and teacher training materials.

M. DESCRIPTION OF MATERIALS ALREADY PRODUCED: Student texts and teachers guides are available for the following titles:

Primary Six-Year Course.
1. Primary One (Revised Preliminary Edition).
2. Primary Two (Preliminary Edition).
3. Primary Three (Preliminary Edition).
4. Primary Four (Preliminary Edition).
5. Primary Five (Preliminary Edition).
6. Primary Six (Preliminary Edition).

Five-Year Course.
7. Secondary One (Preliminary Edition).
8. Secondary Two (Preliminary Edition).
9. Secondary Three (Preliminary Edition) - algebra, geometry.
10. Secondary Four (Preliminary Edition) - algebra, geometry.
11. Secondary Five (Preliminary Edition).

Four-Year Course.
12. Secondary C One (Preliminary Edition) - algebra, geometry.
13. Secondary C Two (Preliminary Edition) - algebra, geometry.
14. Secondary C Three (Preliminary Edition) - algebra, geometry.
15. Secondary C Four (Preliminary Edition).

16. Entebbe Mathematics Teachers' Handbook, Primary I-III (Preliminary Edition).

Basic Concepts of Mathematics, An Introductory Text for Teachers.
17. Volume I (Revised Preliminary Edition) Structure of Arithmetic.
18. Volume II (Revised Preliminary Edition) Structure of Arithmetic.
19. Volume III (Preliminary Edition) Foundations of Geometry.
20. Volume IV (Preliminary Edition) Measurement, Functions, and Probability.

N. MATERIALS AVAILABLE FREE: Materials listed in Section M are available for limited trial use to the Ministries of African countries participating in the program. In special circumstances Inspection Sets of the materials are available to groups in the United States having a particular responsibility for mathematics education in Africa.

O. MATERIALS PURCHASABLE: Primary One, Pupil Book, price: Sh 5/6.-; Primary One, Teacher Guide, price: Sh 15/-; Basic Concepts, Vol. I, Price: Sh 15/-; Basic Concepts, Vol. II, price:

Sh 12/6.-; Secondary C One Algebra, Pupil Book, price: Sh 18/-; Secondary C One Geometry, Pupil Book, price: Sh 15/-; Primary Two, Pupil Book, price: Sh 6/6.-; Primary Two, Teacher Guide, price: Sh 21/-. Available from SRA Ltd., Newtown, Reading Road, Henley-on-Thames, Oxfordshire, England.

P. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

Q. LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: Swahili, Amharic.

R. PROJECT IMPLEMENTATION:

1. Number of teachers using materials: 1,432.
2. Number of students involved: More than 57,000.
3. Number of schools involved: (Not answered).
4. Sources of totals in 1, 2, and 3 above: Item 1 based on reports from ministries of education in countries concerned, indicating number of classes using materials. Item 2 based on average of 40 students per class.
5. Name and location of specific schools where course is being taught: Several schools in each of the African countries: Ethiopia, Ghana, Kenya, Liberia, Nigeria, Malawi, Sierra Leone, Tanzania, Uganda, Zambia, Lesotho, Botswana, Somalia.
6. Availability of consultants for teachers: Available on request from Ministries of Education, consultants are sent to help at in-service teacher training institutes.
7. Activities conducted for in-service teacher training: Large-scale program to make available in each participating country a core of people who will offer leadership in mathematical education and assist in running courses for other teachers and tutors from training colleges.
8. Implementation procedures in addition to above: Deep involvement in the Program of local people in each participating country.

S. PROJECT EVALUATION:

1. Evaluation conducted by: Informal evaluations conducted by U.S.A.I.D., African Ministries of Education, and Program Steering Committee.
2. Instruments used: Achievement tests and comparative tests being developed by the Program.
3. Control groups: None used.
4. Feedback process: Teacher reports; Ministry of Education reports; Visits of Program and Steering Committee personnel.
5. Research evidence of objectives achieved: No formal research evidence to date.

T. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: 1967 Mathematics Workshop held at Nyali Beach Hotel, Mombasa, Kenya, July/August. 1967 second residential period of teacher training Institute held at University College, Nairobi, Kenya, July. 10-month correspondence course being carried on. Materials prepared at 1967 Workshop being printed and will soon be available for trial use in partici-

pating countries.

U. PLANS FOR THE FUTURE: 1968 Mathematics Workshop to be held at Nyali Beach Hotel, Mombasa, Kenya, July/August to continue preparation of material. 1968 Final residential period of teacher training institute to be held at University College, Nairobi, Kenya in July. Country teacher training institutes, with increased interest in implementation activities. Gradual phasing out of experimental program.

A. PROJECT TITLE: AFRICAN PRIMARY SCIENCE PROGRAM.

B. PROJECT DIRECTOR: Robert W. Carlisle, African Primary Science Program, Education Development Center, 55 Chapel Street, Newton, Massachusetts 02160.

C. PROJECT HEADQUARTERS:
1. Contact: African Primary Science Program.
2. Special facilities or activities available for visitor viewing: Limited copies of program materials including films.

D. PRINCIPAL PROFESSIONAL STAFF: R.W. Carlisle, Project Director; R.H. Robins, Administrative Director; C.W. Bassett; R. Francis; E. Godfredsen; D. Lapp; R. Kimball; S. Manning; M.B.R. Savage; P. Christiansen; W. Warren; W. Walton; B. Zubrowski, Science Educators.

E. PROJECT SUPPORT:
1. Organizational sponsorship: Education Development Center.
2. Funding agencies: USAID. Early support came from the Ford Foundation.

F. PROJECT HISTORY:
1. Principal originator: Dr. J. Zacharias, Physics Department, M.I.T.
2. Date and place of initiation: February 1965; Kano, Northern Nigeria.
3. Reason for initiation: To introduce modern methods and materials for teaching science to primary schools of English speaking tropical Africa.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PURPOSES AND OBJECTIVES: Project originally undertaken as research program to determine to what extent new ideas developed for teaching science to primary school children in developed parts of world can be adapted for use in Africa. Special emphasis is placed on so called "discovery method to teaching" using simple apparatus and subject matter relevant to Africa.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Seminars, discussion groups.

J. ORIENTATIONS OF STATED OBJECTIVES: Attitudinal changes, scientific literacy.

K. LOCATION OF LIST OF OBJECTIVES: (Not answered).

L. SPECIFIC SUBJECTS, GRADE AND AGE LEVELS: Primary Schools, K-8.

M. DESCRIPTION OF MATERIALS ALREADY PRODUCED:
Science Units:
1. Ask the Ant Lion.
2. Powders.
3. A Scientific Look at Soil.
Locally Prepared Science Units:
4. Mosquitoes.

5. Growing Seeds.
6. Time and its Measurement.
7. Making Things Look Bigger-Teacher's Guide and Pupil Book.
8. Chicks in the Classroom.
9. Substances, Mixtures & Powders.
10. Soils, Seeds, & Plants.
11. The Fly Cycle.
12. Buds and Twigs.

Science Readers:

13. Chima Makes a Clock.
14. Stars Over Africa.
15. Lower Primary Activities.

N. MATERIALS AVAILABLE FREE: All materials are presently in preliminary trial form and not yet available for distribution. Some are available in limited supply as samples. Other mimeographed material available in sample form only. "A Report of an African Education Program" available on request in limited quantities.

O. MATERIALS PURCHASABLE: None as yet.

P. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: All trial materials presently in English. Two units translated into Swahili.

Q. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: Swahili versions of other program materials to be prepared. No other translation plans at present.

R. PROJECT IMPLEMENTATION:

1. Number of teachers using materials: Definite number unavailable, probably in the order of 200.
2. Number of students involved: Estimated 6,000.
3. Number of schools involved: Estimated 50.
4. Sources of totals in 1, 2, and 3 above: Estimate.
5. Name and location of specific schools where course is being taught: Trial schools associated with program Science Centers in Africa.
6. Availability of consultants for teachers: APSP currently has 10 program supported science educators in six African countries. Other program participants are available in Africa to work with local teachers in the trial use of materials.
7. Activities conducted for in-service teacher training: Seminars and workshops are conducted periodically in most program countries to work with new materials and in general to acquaint teacher tutors, teachers and ministry officials with new teaching methods.
8. Implementation procedures in addition to above: Implementation has not yet been undertaken on any broad scale.

S. PROJECT EVALUATION:

1. Evaluation conducted by: Program personnel under direction of Dr. E. A. Yoloye of University of Ibadan, Nigeria.
2. Instruments used: Instruments have yet to be developed.

A meeting has been called for January 1968 for this purpose.

3. Control groups: (Not answered).
4. Feedback process: (Not answered).
5. Research evidence of objectives achieved: (Not answered).

T. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: Pan African workshop held at Akosombo, Ghana July/August 1967.

U. PLANS FOR THE FUTURE: Evaluation and teacher training meetings scheduled for early 1968; planning conference scheduled spring 1968.

A. PROJECT TITLE: WEST AFRICAN EXAMINATIONS COUNCIL "A" LEVEL CHEMISTRY SYLLABUS.

B. PROJECT DIRECTORS: R.E. Pearson, Dept. of Chemistry, Univ. of Ghana, Legon, Ghana; J. B. Redhead, Dept. of Chemistry, Univ. of Ibadan, Ibadan, Nigeria.

C. PROJECT HEADQUARTERS:

1. Contact: Either of project directors, West African Examinations Council "A" Level Chemistry Syllabus.
2. Special facilities or activities available for visitor viewing: None.

D. PRINCIPAL PROFESSIONAL STAFF: None.

E. PROJECT SUPPORT:

1. Organizational sponsorships: West African Examinations Council (for development of syllabus); Science Teachers Association of Nigeria; Ghana Association of Science Teachers.
2. Funding agencies: National Ministries of Education (for support of refresher courses).

F. PROJECT HISTORY:

1. Principal originators: West African Examinations Council and Ghana Association of Science Teachers.
2. Date and place of initiation: April 1964; Ghana.
3. Reason for initiation: The West African Examinations Council expected to replace the London 'A' Level syllabus then in use in Nigeria, Ghana, Sierra Leone, and The Gambia, by its own syllabus. The Ghana Association of Science Teachers was anxious that the new syllabus should provide a much more up-to-date approach and content than the old, and as a result, formed a Working Party to make proposals for a new syllabus to W.A.E.C.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PURPOSES AND OBJECTIVES: The reasons for introducing the new syllabus are outlined above. Present activity is directed toward producing materials to help the teachers and students to cope with the difficulties presented by the new syllabus. Since teachers and students do not have ready access to materials which their counterparts in more affluent countries take for granted, a considerable amount of effort has been given to activities such as evaluating possible text and reference books, recommending laboratory experiments, listing desirable apparatus, and compiling suitable references from available periodicals. A furth · goal is to develop a suitable laboratory program.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Laboratory investigations; lectures.

J. ORIENTATIONS OF STATED OBJECTIVES: Content mastery; attitudinal changes; ability to use knowledge in solving scientific problems.

K. LOCATION OF LIST OF OBJECTIVES: In preamble to syllabus, in part.

L. SPECIFIC SUBJECTS, GRADE AND AGE LEVELS: Chemistry; 'A' Level (corresponds to London GCE Advanced Level or Cambridge Higher School Certificate); Age: minimum 16 to 18 years.

M. DESCRIPTION OF MATERIALS ALREADY PRODUCED:
1. Syllabuses for thecry and laboratory work.
2. Specimen examinations.
3. Textbook evaluations.
4. Selected experiments (first draft).
5. Teachers' references from periodicals concerned with chemical education.
6. Equipment list (first draft).

N. MATERIALS AVAILABLE FREE: Item 5 from R.E. Pearson.

O. MATERIALS PURCHASABLE: Item 1, from WAEC, 19 Russell Square, London, W.C.1, England, (price, 4 shillings).

P. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

Q. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: None.

R. PROJECT IMPLEMENTATION:
1. Number of teachers using materials: All sixth form schools in Nigeria, Ghana, Sierra Leone, and the Gambia; exact number unknown.
2. Number of students involved: Unknown.
3. Number of schools involved: Unknown.
4. Name and location of specific schools where course is being taught: See R1.
5. Availability of consultants for teachers: Not available on a formal basis.
6. Activities conducted for in-service teacher training: Week-long refresher courses have been held, as well as a workshop/ refresher course during the last Christmas vacation which dealt mainly with the development of the laboratory program.
7. Implementation procedures in addition to above: None.
8. Implementation procedure, seemingly, the most effective: Refresher courses.
9. How evaluated: Responses from teachers.

S. PROJECT EVALUATION: No formal evaluation as yet.

T. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: Some experiments have been developed; some of these took shape at a workshop for teachers in Ghana which was held during the last Christmas holiday. A tentative list of equipment has been drawn up.

U. PLANS FOR THE FUTURE: The main efforts will be to continue and complete the various projects already begun, especially the laboratory program. No new plans have been made.

A. PROJECT TITLE: EDUCATION DEPARTMENT OF WESTERN AUSTRALIA, EXPERIMENTAL SECONDARY SCHOOL MATHEMATICS, YEARS 1-3.

B. PROJECT DIRECTOR: J.R. Greenway, Superintendent of Mathematics, Education Department, Parliament Place, West Perth, Western Australia 6005. Tel. 23-0221.

C. PROJECT HEADQUARTERS:
1. Contact: J.R. Greenway, Experimental Secondary School Mathematics, Curriculum Branch, Education Department, 45 Havelock Street, West Perth, Western Australia 6005.
2. Special facilities or activities available for visitor viewing: None other than visit to classes using materials.

D. PRINCIPAL PROFESSIONAL STAFF: Present: B. Lawrence, Curriculum Officer; I. Froyland, Curriculum Officer; J. Harbisher, Senior Master. Past: B. Andrich, Curriculum Officer; K. Neuer, Master; N. Hoffman, Senior Master; M. Macdonald, Curriculum Officer.

E. PROJECT SUPPORT:
1. Organizational sponsorship: Education Department of Western Australia.
2. Funding agencies: None.

F. PROJECT HISTORY:
1. Principal originator: J.R. Greenway.
2. Date and place of initiation: 1961; Mount Lawley Senior High School.
3. Reason for initiation: Dissatisfaction with existing maths programmes.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PURPOSES AND OBJECTIVES: To develop a modern programme in mathematics for years 1, 2, and 3 in secondary schools (i.e. grades 8, 9, and 10) and to prepare text to accompany these programmes for three levels of student ability - advanced, ordinary and elementary.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study, programmed instruction, classroom teaching with some discovery exercises.

J. ORIENTATIONS OF STATED OBJECTIVES: Content mastery, process acquisition.

K. LOCATION OF LIST OF OBJECTIVES: Not set out in materials.

L. SPECIFIC SUBJECTS, GRADE AND AGE LEVELS: Arithmetic, grades 8, 9 and 10, 13 years - 15 years; trigonometry, grade 10, 15 years; algebra, grades 8, 9, and 10, 13 years - 15 years; geometry, grades 8, 9 and 10, 13 years - 15 years.

M. DESCRIPTION OF MATERIALS ALREADY PRODUCED:
1. Syllabuses in Arithmetic, Algebra, Geometry and Trigonometry for years 1-3.
Textbooks:

approx.); and Set C (Grades 5 & 6 approx.). One kit of materials is intended for a class of up to 40 children.

M. DESCRIPTION OF MATERIALS ALREADY PRODUCED:
1. Set B for Grades 3 and 4 comprising: Placement Test, Number Booklets and Answer Cards, Worksheet Pads, Mastery Test Pads, Assignment Cards and Answer Cards, Record Charts, Transparent Grids, Plastic Building Pegs, Gummed Paper Shapes, Clockface Stamp, Glue, Colored Pencils, Teacher's Handbook.
2. Information Bulletin.
3. Brochure.
4. Review set comprising sample items from No. 1 above.

N. MATERIALS AVAILABLE FREE: Items 2 and 3 above from Australian Council for Educational Research.

O. MATERIALS PURCHASABLE: Item 1 above, $60 (Australian currency) nett. per set, available from Australian Council for Educational Research or from the publishers - Rigby Limited, Adelaide, South Australia. Cost does not include freight (45 lb. wt.); Item 4 above, $5 (Australian currency) nett. per set, available from Australian Council for Educational Research only. Cost does not include freight (1-1/4 lb. wt.).

P. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

Q. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: None.

R. PROJECT IMPLEMENTATION:
1. Number of teachers using materials: Set B: Cannot be determined; Over 2,000 classroom kits of Set B have been purchased. Set C: 20 teachers during 1967 (Experimental only).
2. Number of students involved: Set B: Cannot be determined. Set C: 720+ children during 1967 (Experimental only).
3. Number of schools involved: Set B: Cannot be determined. Set C: 11 schools during 1967 (Experimental only).
4. Sources of totals in 1, 2, and 3 above: Set C: Totals above obtained from project records.
5. Name and location of specific schools where course is being taught: Set C draft materials are being tried at Tullamarine State School (Victoria); Parklands State School (Victoria); Essendon Grammar School (Victoria); St. Albans East State School (Victoria); Reservoir State School (Victoria); Narrabeen Public School (New South Wales); Canterbury Public School (New South Wales); Darra Primary School (Queensland).
6. Availability of consultants for teachers: The Senior Advisory Officer has a permanent display at the project headquarters. Within Australia, review sets are available on loan from A.C.E.R. Teachers using the materials are able to write or telephone the Advisory Services Department for advice. (This service is in addition to State Education Department Programs.)
7. Activities conducted for in-service teacher training: (In addition to State Education Department Programs.) Format of

2. Introductory mathematics, Year I.
3. Fractions, Year I.
4. Decimals, Year I.
5. Ratio and Protraction, Year I.
6. Measurement and Mensuration, Year II.
7. Applications to Commerce, Year II and III.
8. Statistics, Year III.
9. Sentences and Truth Sets, Year I.
10. The Arithmetic Numbers, Year I.
11. The Real Numbers, Year I.
12. Addition of real numbers, Year II.
13. Multiplication of real numbers, Year II.
14. Subtraction and Division, Year II.
15. Open Sentences, Year II.
16. Open Sentences in Two Variables, Year II.
17. Factors, Year III.
18. Relations, Functions and their Graphs, Year III.
19. Geometry (Introductory) Topics 1-6, Year I.
20. Geometry (Advanced) Topics 7,8, Years I and II.
21. Geometry (Advanced) Topics 9-13, Year III.
22. Geometry (Advanced) Topics 14-16, Year III.
23. Geometry (Ordinary) Topics 7-11, Years II and III.
24. Geometry (Elementary) Topics 7-11, Years II and III.
25. Trigonometry Topics I, Year III.
26. Trigonometry Topic II, Year III.

N. MATERIALS AVAILABLE FREE: Texts no longer available free.

O. MATERIALS PURCHASABLE: Texts being held for local use at present; some may become available after school orders have been filled.

P. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

Q. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: None.

R. PROJECT IMPLEMENTATION:
1. Number of teachers using materials: 600 (approx.).
2. Number of students involved: 36,000 (approx.).
3. Number of schools involved: 100+.
4. Sources of totals in 1, 2, and 3 above: Departmental scatistics together with estimates for independent schools.
5. Name and location of specific schools where course is being taught: All State Government Secondary Schools in Western Australia together with the majority of independent schools.
6. Availability of consultants for teachers: Available. One or two day visits to government schools by two consultants.
7. Activities conducted for in-service teacher training: Each teacher attends an intensive one week in-service course before teaching the new materials. 40 minute meetings are held once a week in each school, these are conducted by the senior maths master. All maths teachers attend.
8. Implementation procedures in addition to above: None

described.

S. PROJECT EVALUATION: No formal evaluation other than subjective comments of teachers in the project.

T. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: Preparation of texts (some programmed) for elementary students.

U. PLANS FOR THE FUTURE: Preparation of materials for lowest 25% of student ability group in each of grades 8, 9 and 10. Emphasis on assistance to teachers in the field.

A. PROJECT TITLE: INDIVIDUAL MATHEMATICS PROGRAMME (I.M.P.).

B. PROJECT DIRECTOR: M.L. Clark, Assistant to Director, Australian Council for Educational Research, 9 Frederick Street, Hawthorn, Victoria, 3122, Australia. Tel. 81.1271-2-3.

C. PROJECT HEADQUARTERS:
1. Contact: The Senior Advisory Officer, I.M.P.
2. Special facilities or activities available for visitor viewing: Permanent display at the project headquarters. Visitors should contact the Senior Advisory Officer. Review sets available on loan (within Australia).

D. PRINCIPAL PROFESSIONAL STAFF: John F. Izard, Executive Officer; Ruth Hamilton, Research Assistant; Author panel comprising: John F. Izard, Don H. Goodger, Frank L. Smith, Brian D. Haig, Graham J. Whitehead, Beth M. Blackall. Consultants: S.S. Dunn, Professor of Education, Monash University; J.P. Keeves, Research Fellow, Australian National University; and Curriculum and Research Officers of all Australian State Education Departments.

E. PROJECT SUPPORT:
1. Organizational sponsorships: Australian Council for Educational Research, and State Education Departments.
2. Funding agency: None.

F. PROJECT HISTORY:
1. Principal originator: Australian Council for Educational Research,
2. Date and place of initiation: December, 1964; Melbourne, Victoria, Australia.
3. Reason for initiation: To provide individual teaching materials to suit new mathematics curricula being implemented in all Australian states.

G. PRESENT COMMERCIAL AFFILIATIONS: Set B for Grades 3 and 4 has been published by Rigby Limited, Adelaide, South Australia.

H. PURPOSES AND OBJECTIVES: To develop text and assignment materials which permit individual progress through a modern mathematics program, based upon the outline of content which resulted from the Curriculum Officers' Conference at A.C.E.R., March 1964. All Australian states have courses of study bearing a close correspondence with this outline of content.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Self-directed and teacher-directed assignments.

J. ORIENTATIONS OF STATED OBJECTIVES: Content mastery, attitudinal changes.

K. LOCATION OF LIST OF OBJECTIVES: Chapter 1, Teacher's Handbook, Individual Mathematics Programme, Set B.

L. SPECIFIC SUBJECTS, GRADE AND AGE LEVELS: Elementary School Mathematics: Set A (Grades 1 & 2 approx.); Set B (Grades 3 & 4

approx.); and Set C (Grades 5 & 6 approx.). One kit of materials is intended for a class of up to 40 children.

M. DESCRIPTION OF MATERIALS ALREADY PRODUCED:
1. Set B for Grades 3 and 4 comprising: Placement Test, Number Booklets and Answer Cards, Worksheet Pads, Mastery Test Pads, Assignment Cards and Answer Cards, Record Charts, Transparent Grids, Plastic Building Pegs, Gummed Paper Shapes, Clockface Stamp, Glue, Colored Pencils, Teacher's Handbook.
2. Information Bulletin.
3. Brochure.
4. Review set comprising sample items from No. 1 above.

N. MATERIALS AVAILABLE FREE: Items 2 and 3 above from Australian Council for Educational Research.

O. MATERIALS PURCHASABLE: Item 1 above, $60 (Australian currency) nett. per set, available from Australian Council for Educational Research or from the publishers - Rigby Limited, Adelaide, South Australia. Cost does not include freight (45 lb. wt.); Item 4 above, $5 (Australian currency) nett. per set, available from Australian Council for Educational Research only. Cost does not include freight (1-1/4 lb. wt.).

P. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

Q. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: None.

R. PROJECT IMPLEMENTATION:
1. Number of teachers using materials: Set B: Cannot be determined; Over 2,000 classroom kits of Set B have been purchased. Set C: 20 teachers during 1967 (Experimental only).
2. Number of students involved: Set B: Cannot be determined. Set C: 720+ children during 1967 (Experimental only).
3. Number of schools involved: Set B: Cannot be determined. Set C: 11 schools during 1967 (Experimental only).
4. Sources of totals in 1, 2, and 3 above: Set C: Totals above obtained from project records.
5. Name and location of specific schools where course is being taught: Set C draft materials are being tried at Tullamarine State School (Victoria); Parklands State School (Victoria); Essendon Grammar School (Victoria); St. Albans East State School (Victoria); Reservoir State School (Victoria); Narrabeen Public School (New South Wales); Canterbury Public School (New South Wales); Darra Primary School (Queensland).
6. Availability of consultants for teachers: The Senior Advisory Officer has a permanent display at the project headquarters. Within Australia, review sets are available on loan from A.C.E.R. Teachers using the materials are able to write or telephone the Advisory Services Department for advice. (This service is in addition to State Education Department Programs.)
7. Activities conducted for in-service teacher training: (In addition to State Education Department Programs.) Format of

training program: One-day Seminar comprising lecture, workshop groups, and question-time. Nature of content: Discussion of new mathematics curricula; discussion of materials of Set B; groups work through the scheme. Places where offered: Dependent upon demand.

8. Implementation procedures in addition to above: None.

9. Implementation procedure, seemingly, the most effective: Procedures 6 and 7 are complementary; teachers without access to a seminar mus: have alternative arrangements.

10. How evaluated:

    a. From responses to questionnaires returned after seminars.

    b. From unsolicited comments made by teachers asking for advice by letter (particularly, teachers in remote areas).

S. PROJECT EVALUATION:

1. Evaluation conducted by: Project staff.

2. Instruments used: Tests and attitude scales.

3. Control groups: Where there are pairs of parallel classes, intact class groups are randomly assigned to trial materials groups and control groups. Where this is not possible, classes in a similar adjacent school to the trial school are used for control purposes.

4. Feedback process:

    a. Trial teachers provide written comments on each item their class is using.

    b. Within Victoria, project staff visit trial classes.

    c. Trial classes in other states are supervised by curriculum officers of State Education Departments.

    d. Comments are returned to author panel for consideration.

    e. Revised materials are tried.

5. Research evidence of objectives achieved: A follow-up study of Set B was mentioned in the 1967 Clearinghouse Report.

6. Availability of evidence: Copies of the report of the follow-up study are held by the Project Staff and the University of Melbourne Faculty of Education.

T. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: Revised materials for Kit C (Grades 5 and 6) have been under trial in three States (see Section R above). Further reports on the effectiveness of the materials were made by participating teachers. Curriculum consultants in each State have commented on the suitability of the materials for the various State curricula. Trials are continuing on a wider basis.

U. PLANS FOR THE FUTURE: Publication of Kit C for Grades 5 and 6 during 1968; preparation of initial proposals for Kit A for Grades 1 and 2; preparation of second edition of Kit B; publication of Advisory Service Bulletins.

A. PROJECT TITLE: JUNIOR SECONDARY SCIENCE PROJECT (JSSP).

B. PROJECT DIRECTOR: Professor P. Fensham, Monash University, Chairman of the Science Standing Committee of the Victorian Universities and Schools Examinations Board; Dr. W.C. Radford, Director of the Australian Council for Educational Research.

C. PROJECT HEADQUARTERS:

1. Contact: Mr. L.G. Dale, Executive Officer, JSSP, Junior Secondary Science Project, Australian Council for Educational Research, Frederick Street, Hawthorn. Victoria, 3122, Australia.
2. Special facilities or activities available for visitor viewing: Examination of materials produced and in production; discussion with professional staff; visits to classes conducting trials of materials.

D. PRINCIPAL PROFESSIONAL STAFF: Executive Officer: L.G. Dale; Writers: M.B. Wilkinson; M. Robinson; S.M. Taylor; J. Fox; A.G. Shannon; E. Palmer; K.W. Moritz.

E. PROJECT SUPPORT:

1. Organizational sponsorships: Victorian Universities and Schools Examinations Board; Australian Council for Educational Research.
2. Funding agencies: Ian Potter Foundation; Percy Baxter Charitable Trust; Victorian Department of Education; Myer Foundation; Australian Council for Educational Research.

F. PROJECT HISTORY:

1. Principal originators: The Science Standing Committee of the Victorian Universities and Schools Examination Boards, in conjunction with the Australian Council for Educational Research.
2. Date and place of initiation: February 1966; Hawthorn, Victoria, Australia.
3. Reason for initiation: To provide science learning materials for use in the first four years (grades 7-10) of Victorian secondary schools.

G. PRESENT COMMERCIAL AFFILIATIONS: F.W. Cheshire Publishing Pty. Ltd., 380 Bourke Street, Melbourne, 3000, is publishing the first general edition of the grade 7 materials.

H. PURPOSES AND OBJECTIVES: The learning materials consist of card systems with accompanying teacher's guides, designed to enable individual rate of student progress; laboratory experimentation as an integral part of the learning sequence; facility for modification or supplementation of the material by teachers or project writers.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study; laboratory investigations; discussion groups.

J. ORIENTATIONS OF STATED OBJECTIVES: Content mastery; process acquisition; attitudinal changes; scientific literacy.

K. LOCATION OF LIST OF OBJECTIVES: Objectives for each unit are stated in general terms in the teacher's guides; the list of overall objectives is in the booklet "General Information on First Year Materials".

L. SPECIFIC SUBJECTS, GRADE AND AGE LEVELS: Science, embracing aspects of chemistry, physics, biology, astronomy and geology; grade 7 (Form 1) to grade 10 (Form 4).

M. DESCRIPTION OF MATERIALS ALREADY PRODUCED: The work for each year is divided into units. Each unit consists of a card sequence with optional and remedial branches, terminating in a comprehensive test. A teacher's guide folder accompanies each unit. Each unit is tried in the classroom, revised, re-tried and revised a second time prior to publication. Three Grade 7 units have been published.

1. Unit 1: Introduction. An introduction in card form, to the use of the card learning sequence, with some introduction to the nature of science and to common laboratory equipment.
2. Unit 3: Materials of the Universe. This unit leads students through activities with solids, liquids and gases to a particle model of matter.
3. Unit 9: Places and Things. A study of a biological community to bring out some of the factors determining its structure and some factors influencing changes that may take place. The remainder of the Grade 7 units will be published prior to September 1968.
4. Unit 2: The Sky Throughout the Year. Observation of the sun, moon and southern stars and specification of position by measurement of elevation and azimuth. Some interpretation of the data obtained.
5. Unit 4: When Substances are Mixed. An introduction to chemical change through the study of certain non-reacting mixtures, solutions and reacting mixtures.
6. Unit 6: Energy for Life. An examination of the products of respiration leading to the idea of the release of energy from food during respiration in living things.
7. Unit 5: How Hot Is It? An introduction to temperature and various thermometric properties. Construction and use of a thermometric scale.
8. Unit 8: Food for Living Things. An historical account of the discovery of the role of photosynthesis and a brief comparison between animal and plant modes of nutrition.
9. Unit 7: The Changing Earth. An introduction to the processes affecting topography, including weathering, erosion and sedimentation. Some features of sedimentary rocks.

The following Grade 8 units are being prepared and will be given classroom trials during 1968.

10. Unit 1: Earth's Neighbours in Space. Observation of phases, surface features and movements of the moon. Recognition of the Zodiac constellations and some major stars.
11. Unit 2: Various Living Things. An introduction to the use of keys through observation of vertebrates and invertebrates.

Some consideration of the interaction of plants and invertebrate in their natural surroundings.

12. Unit 3: When Substances are Heated. Investigation of chemical changes during decomposition and oxidation. Experimental comparison of ignition temperatures of four substances.
13. Unit 4: Forces and Interactions. Study of the interactions of objects in electric, magnetic and gravitational force fields. Introduction of charged particles.
14. Unit 5: Compounds in Solution. Distinction between acidic, alkaline and neutral solutions by the use of indicators with explanations in terms of pH.
15. Unit 6: Work and Energy. This unit deals principally with thermal, kinetic and gravitational potential energies and work. It introduces chemical and electrical energies and energy transformations.
16. Unit 7: How Higher Organisms Function. Consideration of the structure - function relationship in mammals and flowering plants. The major part of the unit deals with the way in which the higher organisms obtain energy.
17. Unit 8: The Surface of the Earth. The relationship between land surface features and underlying geological structures. Features of sedimentary, igneous and metamorphic rocks.
18. Unit 9: How Does It Sound? Distinction between loudness, duration, pitch and quality and investigation of their physical causes. Introduction to resonance and overtones.

N. MATERIALS AVAILABLE FREE: Booklet "General Information on First Year Materials" (from Cheshire's). A limited number of trial version teacher's guide folders, which incorporate one of each of the cards and worksheets used in the classroom, for each unit so far produced. Requests should be made to the project executive officer.

O. MATERIALS PURCHASABLE: All published materials. Teacher's guide folders may be purchased separately ($3 (Aust.) each). Class sets contain material for a class of 40 students and cost in the vicinity of $50 (Aust.) for each unit. Costs known (Jan. 1968) are: Unit 1 - $36; Unit 3 - $50; Unit 9 - $50. Requests should be addressed to the Sales Division, Australian Council for Educational Research, Frederick Street, Hawthorn, Victoria, 3122, Australia. Payment should accompany all orders.

P. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

Q. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: None.

R. PROJECT IMPLEMENTATION:
1. Number of teachers using materials: 31.
2. Number of students involved: 1,200, approximately.
3. Number of schools involved: 23.
4. Sources of totals in 1, 2, and 3 above: These figures are

for schools in which official class trials have been conducted.
5. Name and location of specific schools where course is being taught: Methodist Ladies College, Kew, Victoria; Bentleigh High School, East Bentleigh, Victoria.
6. Availability of consultants for teachers: Available; project writers isit trial classes regularly. During 1968, area groups will be set up by the Science Teachers' Association of Victoria.
7. Activities conducted for in-service teacher training: Workshops have been held and more are planned. In these, teachers are given the opportunity to familiarize themselves with the materials, and discussion groups are organized.
8. Implementation procedures in addition to above: Videotaped sequences of classes in action are being used in preservice teacher training at one teacher-training centre. During 1968, several 20-minute films will be prepared for use in teacher training. These will be used primarily for instructional television for teachers.
9. Implementation procedure, seemingly, the most effective: Not yet known.

. PROJECT EVALUATION:

1. Evaluation conducted by: A panel of test-constructors from A.C.E.R., universities, teachers' colleges and Curriculum and Research branch of Victorian Education Department.
2. Instruments used: Comprehensive tests for each unit.
3. Control groups: There has been no attempt to compare the effectiveness of JSSP learning procedures with that of any other learning procedure.
4. Feedback process: Teachers provide detailed comments in special evaluation folders for all materials tried in the classroom; students complete evaluation questionnaires on completion of each unit, student workbooks and test results are analyzed in detail; writers visit regularly each trial class, and monthly meetings of trial class teachers are held.
5. Research evidence of objectives achieved: Analysis of comprehensive test results indicate good progress towards the achievement of specific cognitive objectives.
6. Availability of evidence: To an extent limited by time taken to extract available information. Evidence is available to any visitors to the project.
7. Other pertinent information: An attempt has been made to identify specific behavioral objectives for each unit. A classification of these objectives has been constructed. Difficulty has been encountered in the attempt made to construct a satisfactory instrument for evaluation of affective objectives. This matter is being given further consideration.

T. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: All of the grade 7 materials have been prepared, and all will be published by September 1968. Most of the grade 8 materials have been prepared at the first trial stage at least. Several units are ready for second trial. Publication is

expected to commence about June 1968.

U. PLANS FOR THE FUTURE: During 1967, a critical stage in the life of the project was reached when it was realized that funds available were inadequate for continuation of the projec in the preparation of materials for grades 9-10 as previously planned. An augmented project is being planned jointly by three states - Victoria, Tasmania and South Australia - and an approach will be made to the Federal Government for finance. If adequate finance is granted, the new project will be set up in the latter part of 1968 and will build on to the work alreac done. If adequate funding is not available for the joint project it is expected that the current project will terminate following the publication of the grade 8 materials. It is possible that a small staff may be set up to continue with revision and supplementation of the grades 7 and 8 units, as previously planned.

A. PROJECT TITLE: UNIVERSITY OF SYDNEY SCIENCE TEXTBOOK PROJECT: INTEGRATED AND CO-ORDINATED SCIENCE TEXTBOOK AND TEACHERS' MANUAL SERIES FOR HIGH-SCHOOL STUDENTS AND TEACHERS.

B. PROJECT DIRECTOR: Professor H. Messel, Head of the School of Physics and Director of the Science Foundation for Physics, University of Sydney, Sydney 2006, Australia. Tel. 68-0522, ext. 2537.

C. PROJECT HEADQUARTERS:
1. Contact: Project director, Science Textbook Project.
2. Special facilities or activites available for visitor viewing: (Not answered).

D. PRINCIPAL PROFESSIONAL STAFF: (Not answered).

E. PROJECT SUPPORT:
1. Organizational sponsorships: Science Foundation for Physics, University of Sydney.

F. PROJECT HISTORY:
1. Principal originator: Professor H. Messel.
2. Date and place of initiation: 1961; Sydney.
3. Reason for initiation: Science curriculum reform in New South Wales high-schools.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PURPOSES AND OBJECTIVES: There are four "aims" listed in brochure, page 4.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: (Not answered).

J. ORIENTATIONS OF STATED OBJECTIVES: Content mastery, scientific literacy.

K. LOCATION OF LIST OF OBJECTIVES: (Not answered).

L. SPECIFIC SUBJECTS, GRADE AND AGE LEVELS: Integrated study course in physics, chemistry, biology, and geology for 1st to 4th year high-school students aged about 11 to 15; and physics, chemistry and biology course for 5th and 6th year students aged 16 to 17.

M. DESCRIPTION OF MATERIALS ALREADY PRODUCED:
1. Science for High School Students (2 vols).
2. Science for High School Students-Teachers' Manual.
3. Abridged Science for High School Students (2 vols).
4. Senior Science for High School Students (3 vols: physics, chemistry, and biology).
5. Senior Science for High School Students-Teachers' Manual.

N. MATERIALS AVAILABLE FREE: None.

O. MATERIALS PURCHASABLE: N.S.W. Government Printer, Box 4050, G.P.O., Sydney, 2001, Australia. Prices: Item 1, $A 3.00 per vol.; Item 2, $A 3.00 per vol.; Item 3, $A 2.00 per vol.; Item 4, $A 3.00 per vol. (for physics and chemistry), $A 2.75 per vol. (for biology); Item 5, $A 6.00 per vol.

P. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

Q. LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: Translations envisaged into German, French, Spanish.

R. PROJECT IMPLEMENTATION:

1. Number of teachers using materials: Several thousand.
2. Number of students involved: Some 200,000.
3. Number of schools involved: Some 600-700.
4. Sources of totals in 1, 2, and 3 above: From orders received by Government Printing Office.
5. Name and location of specific schools where course is being taught: 80-90% of high schools in State of New South Wales and selected high schools in other five Australian States.
6. Availability of consultants for teachers: (Not answered).
7. Activities conducted for in-service teacher training: In-service science teacher training course held by University of New South Wales with Senior Science for High School Students texts in 1965.
8. Implementation procedures in addition to above: (Not answered).

S. PROJECT EVALUATION:

1. Evaluation conducted by: Permanent revision panels.
2. Instruments used: (Not answered).
3. Control groups: (Not answered).
4. Feedback process: (Not answered).
5. Research evidence of objectives achieved: Continued successful use by large majority of Departmental and private school throughout State.
6. Availability of evidence: Self-evident.

T. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: (Not answered).

U. PLANS FOR THE FUTURE: (Not answered).

A. PROJECT TITLE: SCIENCE EDUCATION PROJECTS FOR PRIMARY, HIGH SCHOOL AND COLLEGE LEVEL.

B. PROJECT DIRECTOR: Isaias Raw, Scientific Director, Box 2921, S. Paulo, Brazil.

C. PROJECT HEADQUARTERS:
1. Contact: Isaias Raw, Fundacao Brasileira Para O Desenvolvimento Do Ensino De Ciencias.
2. Special facilities or activities available for visitor viewing: Research center, training center, shops for production of equipment. Visitors can follow the whole range of activities. University dormitories are available.

D. PRINCIPAL PROFESSIONAL STAFF: Miriam Krasilchik, teacher training, biology; Antonio Teixeira, physics; Ernesto Giebrecht, chemistry; Rahil Gebara, general sciences; Nabor Rueg, earth sciences; Lidia Lampareli, mathematics; Anita Berardinelli, publications; Manuel Jorge, equipment; Julieta Ormastroni, executive director.

E. PROJECT SUPPORT:
1. Organizational sponsorship: Self supporting organization, as a non-profit foundation supplying books, equipment, training.
2. Funding agency: Grants from Ford Foundation; State of S. Paulo Research Foundation.

F. PROJECT HISTORY:
1. Principal originators: Isaias Raw, M.J. Ormastroni, J. Cavalcanti, and P.M. da Rocha.
2. Date and place of initiation: 1952; S. Paulo.
3. Reason for initiation: Improvement of secondary school science education with emphasis on experimentation and discovery by the students.

G. PRESENT COMMERCIAL AFFILIATIONS: None. The Foundation makes contracts with publishers to publish and distribute books and publications, controlling its rights. Equipment is produced and supplied directly by the Foundation to schools and students.

H. PURPOSES AND OBJECTIVES: The Foundation puts its emphasis on re-evaluation of science education, by active scientists, to persuade the school system and teachers, from primary schools to the university to use new ideas, continuously being developed. Emphasis is on experimentation in the school, done by the students, with low cost equipment or at home with small, low cost kits. The Foundation generates new materials, units and equipment and introduces others based on the NSF supported projects.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study, programmed instruction, laboratory investigations, rediscovery by adequate use of the lab in schools or kits at home.

J. ORIENTATIONS OF STATED OBJECTIVES: Content mastery, process

acquisition, scientific literacy.

K. LOCATION OF LIST OF OBJECTIVES: Teachers guides, reports.

L. SPECIFIC SUBJECTS, GRADE AND AGE LEVELS: Primary school science, primary school, age 7-10; mathematics, high school, age 11-14; mathematics, senior high school, age 15-18; general science, high school, age 11-14; chemistry, senior high school, age 15-18; physics, senior high school, age 15-18; biology, senior high school, age 15-18; earth sciences, astronomy, geography, high school and senior high school, age 14-18; basic sciences, college level, age 19-21.

M. DESCRIPTION OF MATERIALS ALREADY PRODUCED:

1. Primary School Science, first and second of four volumes.
2. Mathematics, adapted from SMSG, 6 of a series of 7 vol.
3. Mathematics, FUNBEC project, 1 of 4 volumes.
4. Mathematics, CECIBA project, 1 of 4 volumes.
5. General Science, FUNBEC, 2 volumes.
6. Conservation project (including exact and social sciences - "conservation" of matter, energy, life, species, human heritage and social structure), 1 of 6 volumes.
7. IPS - translation of the American project, complete.
8. PSSC - translation of the American project, complete.
9. CBA - translation of the American project, complete.
10. CHEM study - translation of the American project, complete.
11. BSCS - blue version - adaptation of the American project, complete.
12. BSCS - green version - adaptation of the American project, preliminary version.
13. BSCS blocks - adaptation of the American project, 2 vols.
14. Physiology and biochemistry, 3 volumes.
15. Psychology - lab guide complete.
16. Earth sciences - ESCP adapted preliminary lab guide.
17. Illinois Astronomy Project - preliminary version adapted, two volumes.
18. Electronics - first of three volumes.
19. Human genetics - series 2 of 5 volumes.
20. Book kits - series of kits resembling pocketbooks, including equipment and instructions for direct use by students of different age levels, 20 of a series of over 50.

N. MATERIALS AVAILABLE FREE: Any textbook (lab guide is generally bound together) and teachers guide. General report in English, newsletter in English to be issued monthly.

O. MATERIALS PURCHASABLE: Equipment to go with the different projects, kits, book-kits.

P. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: All in Portuguese.

Q. LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: Adapted translation of Item 5 is being carried out in India, Peru, and Panama. Book-kits will be available in Spanish.

R. PROJECT IMPLEMENTATION:

1. Number of teachers using materials: Over 10,000.
2. Number of students involved: Over 500,000.
3. Number of schools involved: About 80% of the school system uses some of the materials (books, lab equipment).
4. Sources of totals in 1, 2, and 3 above: Teachers trained, books and equipment sold.
5. Name and location of specific schools where course is being taught: Throughout the Brazilian school system.
6. Availability of consultants for teachers: Six centers have been established (Cecine in Recife, Ceciba in Salvador, Cecimig in Belo Horizonte, Cecisp in S. Paulo and Cecir in Porto Alegre) that provided training by conducting summer institutes, in-service, advisors, and six month training programs. Funbec maintains a leadership training program for the centers, and provides a special training program by contracts in any of the twenty-two states.
7. Activities conducted for in-service teacher training: Activities are conducted in the six centers, and by a number of seminars carried out by them at different locations.
8. Implementation procedures in addition to above: A large number of "sensitizing" courses are being carried out to spread new projects and the philosophy of innovation.
9. Implementation procedure, seemingly, the most effective: Besides teacher training, the most efficient procedures are the innovations in the college entrance board examinations and home experimentation by students.
10. How evaluated: The impact of the college entrance board examinations on the high schools is very obvious in Brazil. They now include lab examinations in chemistry, physics and biology.

S. PROJECT EVALUATION:

1. Evaluation conducted by: The Foundation and the six centers.
2. Instruments used: Teacher and student reports.
3. Control groups: Many of the staff members are actively teaching and use their students.
4. Feedback process: Feedback is obtained by the centers, from teacher reports, expecially those in in-service institutes.
5. Research evidence of objectives achieved: The only objective control is the college entrance board examinations that are organized using similar materials.
6. Availability of evidence: Data of the college entrance board are available for studies.
7. Other pertinent information: College entrance board examination required to enter the University is being carried in the State of S. Paulo by Chagas Foundation.

T. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT:

Completion of general sciences, IPS, CHEMS projects; publication of the text of biochemistry, lab guide of

experimental psychology; release of a series of book-kits; release of volume one of the primary school science, and high school mathematics (FUNBEC and CECIBA).

U. PLANS FOR THE FUTURE: A project at the college level of combined physics and chemistry is being planned; new project on conservation will be worked out; beginning of an adaptation of Nuffield projects.

A. PROJECT TITLE: CENTRE DE RECHERCHES EN PSYCHO-MATHEMATIQUES, PROJET MATHEMATIQUE DE SHERBROOKE.

B. PROJECT DIRECTOR: Prof. Zoltan P. Dienes, 1382 rue Dominion, Sherbrooke, Province de Quebec, Canada. Tel. 819-569-8446.

C. PROJECT HEADQUARTERS:

1. Contact: Director of Center, Projet Mathematique de Sherbrooke, Centre de Recherches en Psychomathematiques, Universite de Sherbrooke, Sherbrooke, Province de Quebec, Canada. Tel. 819-569-7431, ext. 356, 529, 582.
2. Special facilities or activities available for visitor viewing: Pilot classes from grades 1 through 6 at Ecole Eymard, rue Kennedy N. on Mondays between 9 and 5; electronic laboratory.

D. PRINCIPAL PROFESSIONAL STAFF: Prof. Zoltan P. Dienes, Director; Research Assistants: H. Kayler, C. Gaulin, W. Lamon, N. Savary; Organizer of Electronic Laboratory: B. Parkanyi.

E. PROJECT SUPPORT:

1. Organizational sponsorships: Canada Council, Quebec Government, Sherbrooke Roman Catholic School Board, International Study Group for Math. Learning, Ecole Normale du Sacre Coeur de Gesu.
2. Funding agencies: Canada Council, Quebec Government.

F. PROJECT HISTORY:

1. Principal originators: Zoltan P. Dienes, Soeur Rene du Saint Sacrement.
2. Date and place of initiation: January 1965; Ecole Normale du Sacre Coeur, and Commission Scolaire Catholique de Sherbrooke.
3. Reason for initiation: For the renovation of mathematics instruction in the elementary schools of the area, with eventual intention of establishing a research center, as now established by university statute.

G. PRESENT COMMERCIAL AFFILIATIONS: Q.C.D.L., 65 rue Claude Bernard, Paris, 5; Education Nouvelle, Montreal; Herder and Herder, 232 Madison Avenue, N.Y.; E.S.A. Pinnacles, Harlow, Essex, England.

H. PURPOSES AND OBJECTIVES:

1. To build a complete mathematics program from kindergarten to university, based on the most up-to-date knowledge of mathematics and of the thinking process involved in learning it.
2. To match this mathematics program with a language and an art program, with which the mathematics program will be integrated.
3. To develop a research center, which would guide as well as be guided by the work in the classrooms. Hypotheses drawn from the classroom floor are tested in laboratory, and laboratory results are tried out in the classrooms. In fact a continuous two-pronged attack on the psychological cum pedagogical aspects of all the questions is envisaged.

4. To develop a new type of teacher training program in mathematics, and later in the other allied disciplines, using the workshop-laboratory approach, i.e. creating real working situations for the trainees, and the constant use of children during the training program.

The learning of mathematics is regarded as forming an integral part of the development of the child's and of the teacher's personalities. For this reason the greater part of the learning takes place by using concrete situations with materials specially designed, and games continually being invented to enrich the learning; the work is for the greater part done in small groups, using materials and instruction cards, where discussion amongst the children and between teacher and children form an important part of the learning. Particular attention is paid to all the detailed components of the process of abstraction, each level being specially catered for through the provision of appropriate abstraction experiences through which children become skilled at "climbing the abstraction ladder". Mathematically speaking, emphasis is laid on structure, natural number being introduced only after lengthy exercises on sets and relations, groups structures as well as ring structures are handled very early (from 8 years of age onwards), and all mathematics, whether arithmetical, algebraical or geometrical in nature, is handled in an intellectually honest way.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study; laboratory investigations; discussion groups; computer assisted instruction; use of concrete materials to encourage abstraction process.

J. ORIENTATIONS OF STATED OBJECTIVES: Content mastery; process acquisition; attitudinal changes; scientific literacy; establishment of "learning sets" in other words "learning to learn".

K. LOCATION OF LIST OF OBJECTIVES: (Not answered).

L. SPECIFIC SUBJECTS, GRADE AND AGE LEVELS: Mathematics, between ages 6 and 12.

M. DESCRIPTION OF MATERIALS ALREADY PRODUCED:

1. Modern Mathematics fr young children Z.P.D., Herder and Herder.
2. First years in Mathematics, Z.P.D. and E.W. Golding, Herder & Herder, Volumes I, II, III Logic, Sets and Numbers, Geometry and Measure.
3. Geometry through Transformations, Z.P.D. and E.W. Golding, Herder & Herder, Volumes I, II, III Distortion, Euclidean, Groups and Coordinates.
4. Introduction a l'axiomatique (will be Part IV of above) Z.P.D.
5. Approach to Modern Mathematics (Z.P.D. et E.W.G.), La logique a l'elementaire (ZPD) (4 and 5 available from Center on application, along with many others).

N. MATERIALS AVAILABLE FREE: None.

O. MATERIALS PURCHASABLE:

1. Concept Formation and Personality - Leicester University Press (1965), $3.00.
2. An Experimental study of Mathematics Learning (1963) - Hutchinson (London), $4.00.
3. Building up Mathematics (Hutchinson Educational) - (1960), $3.00.
4. The Power of Mathematics (Hutchinson Educational) - (1964), $3.00.
5. Approach to Modern Mathematics (1967) - Sherbrooke, $4.00.
6. Manual of Instructions for the use of Arithmetic Loops (1967), $1.00.
7. Introduction to Modern Algebra (1966) - Sherbrooke Part I, II, III (each), $3.00.
8. La Logique a 1'Elementaire (1967) - Sherbrooke, $4.00.
9. Introduction a 1'Axiomatique (1967) - Sherbrooke, $3.00.
10. L'Apprentissage de la Logique, $3.00.
11. Sur la construction des anneaux, $2.00.
12. Sur la generation des structures (On Generating Structures) $2.00.
13. Les Premiers Pas en Mathematique, Part I, II, III (each), $1.75.
14. La Mathematique Moderne dans 1'enseignement primaire, $2.30.
15. Geometrie Euclidienne Part I, II, III (each), $1.20.

P. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: French and English.

Q. LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: English and French (Many translated into German, Italian, and Spanish).

R. PROJECT IMPLEMENTATION:

1. Number of teachers using materials: About 35 in Sherbrooke, but many hundreds if not thousands in other projects allied to this project through the International Study Group for Mathematics Learning.
2. Number of students involved: About 1,000 children involved now in Sherbrooke. Planning to double this in September, as well as add another 80 classes outside Sherbrooke.
3. Number of schools involved: About 20 schools from September 1968. Intensively, three schools, in two of which no other mathematics instruction is given.
4. Sources of totals in 1, 2, and 3 above: By a process of addition.
5. Name and location of specific schools where course is being taught: Ecole Eymard, rue Kennedy Nord, Sherbrooke, Ecole Sainte Famille et Ecole La Porte, 8e Avenue Nord, Sherbrooke.
6. Availability of consultants for teachers: Available. Project director and two assistants pay regular visits. Weekly discussions are held at each level for clearing up difficulties and for planning work ahead.
7. Activities conducted for in-service teacher training: Ten whole days during the year are spent in workshops-laboratory activity, with use of concrete materials, where

teachers work as though they were the children. Also see R6.
8. Implementation procedures in addition to above: Work in the local teacher training establishment goes on side by side, and the staff already has some such trainees in the project schools Consultants are brought in from outside, such as Prof. Rosenbloom, Prof. Sawyer (Toronto), who work with the children and the teachers.
9. Implementation procedure, seemingly, the most effective: The weekly visit in the actual classroom is probably the most effective, after this comes the weekly discussion-cum-laborator session.
10. How evaluated: Merely by teacher reaction, and observation of teacher effectiveness. Controlled experiments, with the aid of subventions from Quebec, are planned for 1968-1969 to establish some concrete results.

S. PROJECT EVALUATION:

1. Evaluation conducted by: Mr. William Lamon, from Berkeley (University of California) is in Sherbrooke for a year to do some evaluating. This is an almost impossible task, since it is not yet known how to measure the abstraction process.
2. Instruments used: The staff is using attitude tests and intelligence tests, pre- and post-tests as well as abstraction tests developed at the Center.
3. Control groups: There are control groups and they were chosen on a pairing basis, taking into account school achievement, intelligence, socio-economic status.
4. Feedback process: Evaluation is in progress, there is no feedback yet, except the unanimous enthusiasm of the children for the programme, established by one of the assistants in home interviews recently.
5. Research evidence of objectives achieved: None yet, except the "existence theorem" evidence that children are learning the type of mathematics that literally belongs to university level. For example axciomatization; some children have even tackled completeness problems.
6. Availability of evidence: Results will be published in monograph form as well as in articles in the Journal of Structural Learning. Visitors are welcome to assess progress on the spot.
7. Other pertinent information: Similar evaluation is taking place in the following places, using some variants of the Sherbrooke Program: England, Australia, Hungary.

T. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: Contact has been maintained and enlarged between the Project and the work started last year in Heidelberg, Germany. The director visited Hamburg in November when he was Chairman of the UNESCO Conference on Mathematics Learning and established the beginnings of a Mathematics Project in Hamburg elementary schools. Contacts were also renewed with Budapest.

U. PLANS FOR THE FUTURE: (Not answered).

A. PROJECT TITLE: ADAPTATION OF THE BSCS YELLOW VERSION HIGH SCHOOL BIOLOGY INTO CHINESE LANGUAGE (CHINESE BSCS).

B. PROJECT DIRECTOR: T.P. Koh, Director, Science Education Center (Chinese Cultural College), P.O. Box 5052, Taipei, Taiwan (Formosa), China.

C. PROJECT HEADQUARTERS:
1. Contact: T.P. Koh, Chinese BSCS.
2. Special facilities or activities available for visitor viewing: Publications.

D. PRINCIPAL PROFESSIONAL STAFF: Chines BSCS Committee: T.P. Koh, C.H. Wong, S.J. Tang, C.H. Lin, Roy Yip, Chuen Mo To, Y.H. Yang, Francis F. Yao, Helen Lee Liu, Robert K.C. Shan, Fabien Cheng.

E. PROJECT SUPPORT:
1. Organizational sponsorships: Chinese BSCS Committee, Science Education Center.
2. Funding agencies: Free contribution of biologists, teachers and educators; partial support of the Asia Foundation; partial support of the BSCS headquarters, Boulder.

F. PROJECT HISTORY:
1. Principal originators: T.P. Koh; Arnold B. Grobman; Ministry of Education, Taiwan.
2. Date and place of initiation: January 1963; Taipei.
3. Reason for initiation: To improve the biological education of the 10th grade students.

G. PRESENT COMMERCIAL AFFILIATIONS: The Commercial Press Limited, Taipei.

H. PURPOSES AND OBJECTIVES: This is not a simple translation of the American BSCS yellow version, but a try to make adaptations, and to change some flora and fauna to fit the local environment.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Laboratory investigations, lectures, discussion groups.

J. ORIENTATIONS OF STATED OBJECTIVES: Process acquisition, attitudinal changes, scientific literacy.

K. LOCATION OF LIST OF OBJECTIVES: (Not answered).

L. SPECIFIC SUBJECTS, GRADE AND AGE LEVELS: The 10th grade students of regular high schools, and the 10th grade students of normal, nursing and agricultural colleges.

M. DESCRIPTION OF MATERIALS ALREADY PRODUCED:
1. Textbook, vol. 1 (chapters 1-20).
2. Laboratory guide, vol. 1.
3. Textbook, vol. 2 (chapters 21-41).
4. Laboratory guide, vol. 2.
5. Textbook and laboratory guide, vol. 1 combined.
6. Textbook and laboratory guide, vol. 2 combined.

The first experimental editions were printed in 1966; based on

the feedback received from teachers and students, the staff prepared the second edition. The second editions were printed in January and February 1968.

N. MATERIALS AVAILABLE FREE: Items 1, 2, 3, 4, 5, 6. Limited number of copies have been distributed free of charge to teachers, students, biologists and educators both in Taiwan and in foreign countries. Local students and teachers who received free copies were required to send their feedback.

O. MATERIALS PURCHASABLE: For local schools and for foreign countries: Item 1, NT$21.90, US$0.67; Item 2, NT$8.30, US$0.23; Item 3, NT$21.90, US$0.67; Item 4, NT$8.50, US$0.25; Item 5, NT$30.20, US$1.00; Item 6, NT$30.40, US$1.03.

P. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: Chinese Language.

Q. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: If budget permits, the materials may be translated into English for the use of the American schools in Taiwan.

R. PROJECT IMPLEMENTATION:

1. Number of teachers using materials: About 20 in 1966-67; about 35 in 1967-68.
2. Number of students involved: About 4500 in 1966-67; about 6000 in 1967-68.
3. Number of schools involved: About 6 schools in 1966-67; 10 schools in 1967-68.
4. Sources of totals in 1, 2, and 3 above: (Not answered).
5. Name and location of specific schools where course is being taught: Hsin-chu High School, Hsinchu; Fu-shin High School, Peitau; Chien-kuo High School, Taipei; Hua-lien Girls High School, Hualien; Taipei Normal College, Taipei; Hua-lien Normal College, Hualien; Nanjon Girl High School, Tainan; Weitau High School, Taichung Weili Girl School, Taipei; Taipei Nursing College, Taipei.
6. Availability of consultants for teachers: Service is limited only to some schools.
7. Activities conducted for in-service teacher training: In-service teacher training has started since 1964 at Taiwan Normal University.

S. PROJECT EVALUATION: Evaluation has not yet started.

T. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: (Not previously reported).

U. PLANS FOR THE FUTURE: The staff is going to prepare the teachers manual which will consist of the following parts: 1. Rationale; 2. Suggested films; 3. Answers to questions in textbook; 4. Answers to questions in laboratory guide; 5. Invitations to inquiry; 6. Tests. The staff is scheduled to complete the first experimental booklet in 1968-69.

A. PROJECT TITLE: IMPROVEMENT OF SCIENCE TEACHING IN COLOMBIA.

B. PROJECT DIRECTOR: Alberto Ospina, Fundación para el Fomento Educativo, Calle 19 #6-68 Of. 1007, Bogotá, Colombia SA.

C. PROJECT HEADQUARTERS:
1. Contact: Dr. Josue Muñoz, Director Instituto de Ciencias, Improvement of Science Teaching in Colombia, Cra. 13 #38-83, Bogotá, Colombia. Tel. 45-99-42.
2. Special facilities or activities available for visitor viewing: Laboratory, audio visual aids, work shops, library.

D. PRINCIPAL PROFESSIONAL STAFF: Josue Muñoz, Director; Vicente Casas, program for introduction to science; Washington Fernandez, physics program.

E. PROJECT SUPPORT:
1. Organizational sponsorships: Fundación para el Fomento Educativo, MIT Club of Colombia, ICETEX, Colombian Ministry of Education, Bank of the Republic, (Colombia), Peace Corps.
2. Funding agencies: Fundación para el Fomento Educativo, Carvajal and Co., Colombian Ministry of Education.

F. PROJECT HISTORY:
1. Principal originators: Alberto Ospina, Josue Muñoz, Juan Herkrath, MIT Club de Colombia.
2. Date and place of initiation: The program was initiated in 1965, The Science Institute in 1966; Bogota, Colombia, SA.
3. Reason for initiation: The low quality of science teaching in Colombia, especially in the primary and secondary levels. The need to bring a renovation in science teaching. The desirability of adopting the new science materials developed during the past decade in the U.S. and Europe.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PURPOSES AND OBJECTIVES: To improve science teaching in Colombia; to make available new materials and textbooks to Colombian science teachers and students. To promote science among young Colombian students; to create interest and incentive in science education.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Laboratory investigations, lectures, seminars, discussion groups, workshops and night courses for in-service science teachers.

J. ORIENTATIONS OF STATED OBJECTIVES: Content mastery, process acquisition, attitudinal changes, scientific literacy.

K. LOCATION OF LIST OF OBJECTIVES: In a booklet on the Science Institute that can be given free upon request.

L. SPECIFIC SUBJECTS, GRADE AND AGE LEVELS: Physics, PSSC; biology, BSCS; chemistry, CHEMS; Berkeley Physics.

M. DESCRIPTION OF MATERIALS ALREADY PRODUCED:
1. PSSC equipment and textbooks.

2. E.S.I. - E.S.S. Science Units.
3. Translation of PSSC, CHEMS Study and BSCS textbooks.

N. MATERIALS AVAILABLE FREE: Newsletter, booklet on the Science Institute and the Science Fair.

O. MATERIALS PURCHASABLE: PSSC textbook and lab. Guide in Spanish; BSCS textbook in Spanish; CHEMS textbook in Spanish.

P. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: Spanish.

Q. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: No other.

R. PROJECT IMPLEMENTATION:
1. Number of teachers using materials: 1000.
2. Number of students involved: 20,000.
3. Number of schools involved: 80.
4. Sources of totals in 1, 2, and 3 above: From available data have taken a percentage of the number of teachers that have taken courses at the Institute.
5. Name and location of specific schools where course is being taught: Official Public Schools of Colombia, University of Antioquia, National University of Colombia.
6. Availability of consultants for teachers: Staff members of the Institute are available for consulting.
7. Activities conducted for in-service teacher training: Night courses, Vacation Institutes, Workshops.
8. Implementation procedures in addition to above: Organizing a Rotary Fund to be able to supply materials and teaching aids to schools on a loan basis.
9. Implementation procedure, seemingly, the most effective: In-service institutes.
10. How evaluated: By feedback research.

S. PROJECT EVALUATION:
1. Evaluation conducted by: Institute staff.
2. Instruments used: Correspondence and field visits.
3. Control groups: None used.
4. Feedback process: Correspondence and refresher courses.
5. Research evidence of objectives achieved: No time for results, yet.

T. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: Berkeley Physics Course at the National University; Modern Mathematics Course at the Institute site. Courses to in-service teachers on the construction of lab materials: PSSC course at U. of Cartagena; CHEMS course at U. of Tolima; BSCS course at U. of Manizales; IPS course at the Institute site; Introductory Space Science Workshop at U. of Atlántico; ESS Units explained through Educational T.V.

U. PLANS FOR THE FUTURE: Science Fair, August 1968; continuation of 1967 courses; Space Science Show in cooperation with NASA.

A. PROJECT TITLE: FRANKFURTER PROJEKT.

B. PROJECT DIRECTOR: Prof. Dr. Heinrich Bauersfeld, Rossertstrasse 45, Eppenhain/Taunus 6241, West Germany. Tel. 06198-8282.

C. PROJECT HEADQUARTERS:
1. Contact: Seminar fur Didaktik der Mathematik, der J.W. Goethe-Universitat, Senckenberganlage 11, Frankfurt am Main 6000, Western Germany. Tel. 0611-7983539.
2. Special facilities or activities available for visitor viewing: Visit headquarters for discussion or the classes at work.

D. PRINCIPAL PROFESSIONAL STAFF: G. Homann; V. Weis; K. Rickmeyer; A. Nortmann; Dr. U. Lubeseder.

E. PROJECT SUPPORT:
1. Organizational sponsorship: Kultusministerium des Landes Hessen.
2. Funding agency: Max-Trager-Stiftung.

F. PROJECT HISTORY:
1. Principal originator: Heinrich Bauersfeld.
2. Date and place of initiation: November 1966; Frankfurt.
3. Reason for initiation: See Section H.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PURPOSES AND OBJECTIVES: Modernizing the teaching of mathematics and its preparation from K-4; developing new materials and methods of mathematics teaching; producing teacher's manuals from K-4; investigating cognitive processes, esp. the relation between thought and language, thought and symbols, etc. (the non-mathematical effects of teaching mathematics).

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Programmed instruction for teachers; children are working in small groups with structured materials.

J. ORIENTATIONS OF STATED OBJECTIVES: (Not answered).

K. LOCATION OF LIST OF OBJECTIVES: See Section M.

L. SPECIFIC SUBJECTS, GRADE AND AGE LEVELS: Mathematics, K-4, from the age of 5 to 11+.

M. DESCRIPTION OF MATERIALS ALREADY PRODUCED:
1. "Matema" (materials for teaching mathematics). No. 1 "Begriffsspiel" - plastic discs derived from N. Ach's material.
2. Teachers guide to "Begriffsspiel".
3. "Mathema" No. 2 "Formenspiel" - plastic discs of different shapes and sizes, different color on each side, and a set of task cards.
4. Teachers guide to "Formenspiel".
5. "Lehrerhandbuch fur das 1.Schuljahr", 1.Lieferung.

N. MATERIALS AVAILABLE FREE: None.

O. MATERIALS PURCHASABLE: Items 1-5 from Hermann Schroedel Verlag KG, Zeiss Strasse 10, Hannover-Dohren 3000, Western Germany, under "Best.-Nr. 63 001-5".

P. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: German.

Q. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: English.

R. PROJECT IMPLEMENTATION:

1. Number of teachers using materials: 450 in September 1968, 10 in February 1968.
2. Number of students involved: 16,000 in September 1968, 400 in February 1968.
3. Number of schools involved: Approximately 6 in February 1968.
4. Sources of totals in 1, 2, and 3 above: Correspondence with the teachers.
5. Name and location of specific schools where course is being taught: Preparatory research in: Friedrich-Ebert-Schule, Schwalbach-Limes 6231; Munzenberger-Schule, Frankfurt am Main 6000; Peter-Petersen-Schule, Frankfurt am Main 6000; Ernst-Reuter-Gesamtschule, Ffm-Nordwest-Stadt 6000; Volksschule Oberursel-Sud 6370; Volksschule Lauenforde 3471.
6. Availability of consultants for teachers: Seminars at University (fortnightly); teachers refersher courses (one week each).
7. Activities conducted for in-service teacher training: 10 one-week-courses in 1968; programmed instruction (in preparation).
8. Implementation procedures in addition to above: Performances, lectures and several television activities (information for teachers and parents).
9. Implementation procedure, seemingly, the most effective: Probably television.
10. How evaluated: By the large number of contacts, which have been caused by television performances, supporting the spread of the materials.

S. PROJECT EVALUATION:

1. Evaluation conducted by: Dr. Weis, Ruhr-Universitat Bochum.
2. Instruments used: Several tests.
3. Control groups: Used as many control students as there are project-students (i.e., 10 teachers and 400 students at present). Chosen by equivalence of conditions at the start of experiment.
4. Feedback process: (Not answered).
5. Research evidence of objectives achieved: Differences between pre-test and post-test results in comparison with the control groups.
6. Availability of evidence: Available from project director.
7. Other pertinent information: After preparatory work begun in November 1966, the staff began systematic use of materials in September 1967, in 10 classes of 6-7 year-old children. These children work together to the end of grade 4 (11+),

in the project. The staff produces the teachers manuals and formulates the hypotheses, which are to be substantiated in the main investigation. The main investigation shall start in September 1968 in a large number of classes (about 450 teachers), parallel to the work mentioned above, and will be continued until 1972 (grade 4).

T. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: (Not previously reported).

U. PLANS FOR THE FUTURE: Teachers handbook for the beginning will appear completely at the end of 1968.

A. PROJECT TITLE: JOINT SCHOOLS PROJECT (J.S.P.).

B. PROJECT DIRECTOR: No such office.

C. PROJECT HEADQUARTERS:

1. Contact: The General Editor, Joint Schools Project, P.O. Box 62, Legon, Ghana.
2. Address: Department of Mathematics, University of Ghana, P.O. Box 62, Legon, Ghana. Tel. Accra 76551, ext. 27.
3. Special facilities or activities available for visitor viewing: Experimental classes, by arrangement.

D. PRINCIPAL PROFESSIONAL STAFF: M.C. Mitchelmore, General Editor; B. Raynor, Revision Editor. In addition, a large number of teachers in service in schools in Ghana have contributed original materials or assisted in revisions.

E. PROJECT SUPPORT:

1. Organizational sponsorships: University of Ghana; Ministry of Education.
2. Funding agencies: The Nuffield Foundation and C.R.E.D.O., London; Ministry of Overseas Development, London; and several local bodies.

F. PROJECT HISTORY:

1. Principal originators: Eight teachers from Mfantsipim, Achimota School and Prempeh College, members of the Mathematical Association of Ghana.
2. Date and place of initiation: February 1964; Achimota School, Ghana.
3. Reason for initiation: To co-ordinate efforts in the three schools to teach modern topics in the first two years of secondary school (grades 7 and 8).

G. PRESENT COMMERCIAL AFFILIATIONS: Longmans, Green & Co. publish trial and permanent editions of textbooks.

H. PURPOSES AND OBJECTIVES: The aim is to produce a mathematics course for secondary schools in West Africa, up to the present 'O'-level. This course is to be:

a. Founded on practical work, to make up for a lack of opportunity for such experience in students' cultural and educational background.
b. Relevant to their surroundings and future needs, to encourage learning by understanding rather than by rote.
c. An intuitive development, since experience has shown that over-emphasis on logic kills all interest and hinders progress.
d. Modern, where modern topics help to attain the aims of a-c.

The course will be at two levels: Basic - for those students who will do no more mathematics after 'O'-level; Special - for those who will specialize in science subjects after 'O'-level. This project differs from similar projects by placing much more emphasis on how mathematics arises naturally

in the environment and how it can be applied in various situations, than on the logical structure of mathematics itself. The originators of the project felt that this approach would prove to be much more valuable for the average secondary school student in Ghana.

J. METHODS OF INSTRUCTION USED IN THE PROJECT: Lectures, discussion groups, normal teaching methods.

K. ORIENTATIONS OF STATED OBJECTIVES: Content mastery, attitudinal changes, acquaintance with present-day applications of mathematics.

L. LOCATION OF LIST OF OBJECTIVES: Annual Report 1968, Item 6 in Section M.

M. SPECIFIC SUBJECTS, GRADE AND AGE LEVELS: Mathematics in secondary schools, grades 7-11, ages 12-16.

N. DESCRIPTION OF MATERIALS ALREADY PRODUCED:

1. Textbook 1, Workbook 1 and Teacher's Guide 1 (permanent edition).
2. Textbook 2, Workbook 2 (Trial edition), 2 parts to each.
3. Textbook 3, Workbook 3 (Trial edition), 2 parts to each.
4. Textbook 4 (Basic course) (Trial edition), 2 parts.
5. Additional Mathematics (preliminary edition), first 2 parts.
6. Annual Report 1968.

O. MATERIALS AVAILABLE FREE: Single copies of items 2-6 are available to interested persons, from the Project Headquarters.

P. MATERIALS PURCHASABLE: Item 1, Textbook 10s, Workbook 4s, Teacher's Guide 15s, available from Longmans, Green & Co. Ltd., London.

Q. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

R. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: None.

S. PROJECT IMPLEMENTATION:

1. Number of teachers using materials: About 65.
2. Number of students involved: About 5,000.
3. Number of schools involved: About 25.
4. Sources of totals in 1, 2, and 3 above: Project records and publisher's reports.
5. Name and location of specific schools where course is being taught: Ghana: Mfantsipim, Cape Coast; Achimota School, Accra; Prempeh College, Kumasi. Nigeria: Queen's College, Yaba; St. Anne's College, Ibadan; Women's Training College, Kano. Uganda: King's College, Budo. Jamaica: Knox College, Spaldings.
6. Availability of consultants for teachers: In Ghana, teachers using JSP materials meet editors and other writers at least once a term. (See Section S.) JSP is willing to provide consultants for special conferences outside Ghana.
7. Activities conducted for in-service teacher training:

In Ghana, teachers using the trial edition meet for a day conference once a term. An annual 3-week training conference has been instituted in Ghana, for those who are completely new to the modern approach. These will be followed up by once a term one-day conferences organized by regional committees of the Mathematical Association of Ghana. It is expected that these will become more frequent once more schools in Ghana start using the JSP materials.

8. Implementation procedure, seemingly, the most effective: Teaching and discussing materials with a view to revision and improvement.

9. How evaluated: Subjectively.

S. PROJECT EVALUATION:

1. Evaluation conducted by: See Section U.
2. Instruments used: See Section U.
3. Control groups: See Section U.
4. Feedback process: The Project proceeds on the basis of cooperation between the teachers engaged in teaching the material. All material is circulated for comments before publication, and a representative committee meets to discuss its revision after it has been taught. Schools outside Ghana send in written reports. This is, at present, the only means of evaluation.

T. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: Not previously reported.

U. PLANS FOR THE FUTURE: The next books to be published will be: Book 2, Workbook 2 and Teacher's Guide 2, permanent edition (Sept. 1968); Book 5 (Basic course) Trial edition (Sept. 1968). Book 4s (Special course) Trial edition Sept. 1968; and the last two parts of Additional Mathematics, preliminary edition, 1968. It is hoped to develop achievement and attitude tests for the evaluation of the Project in cooperation with the Ministry of Education. Preparation of editions for Training Colleges (based on Books 1-3) and for other parts of the tropical world.

A. PROJECT TITLE: CONTEMPORARY SCHOOL MATHEMATICS (C.S.M.) (THE ST. DUNSTAN'S COLLEGE SYLLABUS).

B. PROJECT DIRECTOR: Alan J. Sherlock, St. Dunstan's College, Catford, London, S.E.6. Tel. 01-690-0117.

C. PROJECT HEADQUARTERS:
1. Contact: The Director, C.S.M.
2. Special facilities or activities available for visitor viewing: Visitors are always welcome to visit classes.

D. PRINCIPAL PROFESSIONAL STAFF: T. E. Brand, J.Q. Thompson, H.D. Ellerby, D.W.M. Wade, T.G. Pratt, M.G. Phillips.

E. PROJECT SUPPORT: (Not answered).

F. PROJECT HISTORY:
1. Principal originators: Dr. Geoffrey Matthews, now Organizer of the Nuffield Foundation Project (5-13); C.A.R. Bailey, now Principal Lecturer in Mathematics Newton Park; F.B. Lovis, now Principal Lecturer in Mathematics Leicester; T.C. Bath; A.J. Sherlock; J.A.C. Reynolds.
2. Date and place of initiation: About 1960; St. Dunstan's College, Catford, S.E.6.
3. Reason for initiation: There are many reasons for the introduction of new topics although basically believe that mathematics today should be relevant to the world today, hence computers, sets and logic (Boolean Algebra, switching circuits), matrices and statistics.

G. PRESENT COMMERCIAL AFFILIATIONS: All work is being published by: Edward Arnold (Publishers) Ltd., 41, Maddox Street, London, W.1.

H. PURPOSES AND OBJECTIVES: To give the children an awareness of the basic structure of mathematics and also to find and apply mathematics in the world in which the children live.
Unique characteristics - Apart from isolated topics, the syllabus differs in that (a) the structure of mathematics (e.g. groups) is a central recurring theme; (b) matrices are given a place of importance (from the start); (c) computers are investigated, not only the logic of the computer but also the 'hardware' is discussed; (d) two-thirds of the syllabus is of traditional material (including Euclidian Geometry) treated with an up-to-date approach.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study, lectures.

J. ORIENTATIONS OF STATED OBJECTIVES: Content mastery, process acquisition, attitudinal changes, scientific literacy.

K. LOCATION OF LIST OF OBJECTIVES: In the free brochure obtainable from the publishers.

L. SPECIFIC SUBJECTS, GRADE AND AGE LEVELS: Mathematics for ages 11-16.

M. DESCRIPTION OF MATERIALS ALREADY PRODUCED:

1. Matrices I, G. Matthews.
2. Sets & Logic I, C.A.R. Bailey.
3. Computers I, F.B. Lovis.
4. Shops, size & place, J.A.C. Reynolds.
5. Matrices II, G. Matthews.
6. Sets & Logic II, C.A.C. Bailey.
7. Computers II, F.B. Lovis.
8. An Intro. to Probability and Statistics, A.J. Sherlock.
9. Mathematics I, H.D. Ellerby and A.J. Sherlock.
10. Mathematics II, H.D. Ellerby and A.J. Sherlock.
11. Mathematics III; T.E. Brand, D.W.M. Wade, and A.J. Sherlock.
12. Mathematics IV; T.E. Brand, D.W.M. Wade, and A.J. Sherlock.
13. Geometry and Logic, C.A.R. Bailey.
14. Exercises I, H.D. Ellerby, M.G. Phillips, and T.E. Brand.
15. Exercises II, T.E. Brand and D.W.M. Wade.

N. MATERIALS AVAILABLE FREE: Publicity brochure from publishers: Edward Arnold (Publishers) Ltd., 41, Maddow Street, London, W.1.

O. MATERIALS PURCHASABLE: Items 1-8, 5s. each; Item 9, 15s.; Item 10, 12s.6d.; Items 11-12, in press; Item 13, 6s.; Item 14, 7s.6d.; Item 15, in press.

P. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

Q. LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: Spanish, Italian (Czech under consideration).

R. PROJECT IMPLEMENTATION:

1. Number of teachers using materials: Unknown.
2. Number of students involved: Booklets (i.e. 1-8) have sold over 50,000 each, the course books (9-12) about 12,000.
3. Number of schools involved: Over 120.
4. Sources of totals in 1, 2, and 3 above: Publishers records.
5. Name and location of specific schools where course is being taught: St. Dunstan's College, Catford, London, S.E.6.; Cardiff High School for Boys, Cardiff, Wales; Broxbourne Grammar School, Herts; Kings College, Hong Kong; etc.
6. Availability of consultants for teachers: Information is readily available from St. Dunstan's College.
7. Activities conducted for in-service teacher training: Frequent lectures are given to teachers regarding the content of the syllabus.

S. PROJECT EVALUATION: (Not answered).

T. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: Completion of Mathematics III, Mathematics IV and Exercises II.

U. PLANS FOR THE FUTURE: Experimental Sixth Form texts are in production. These are: Matrices Pure and Applied and Introduction to Operational Research. Vectors should be published in 1969. A statistics text is also planned.

PROJECT TITLE: MATHEMATICS IN EDUCATION AND INDUSTRY (M.E.I.).

PROJECT DIRECTOR: S.L. Parsonson, 57 High Street, Harrow on the Hill, Mddx., U.K. Tel. Byron 5267.

PROJECT HEADQUARTERS:
1. Contact: Project Director, M.E.I.
2. Special facilities or activities available for visitor viewing: Only a little peripheral computing equipment.

PRINCIPAL PROFESSIONAL STAFF: All members of this Project are serving schoolmasters.

PROJECT SUPPORT:
1. Organizational sponsorship: Industrial Committee of the Mathematics Association of Great Britain.
2. Funding agency: Supported by B.P.-Shell-Mex.

PROJECT HISTORY:
1. Principal originator: B.T. Bellis, Esq.
2. Date and place of initiation: 1962; Highgate, London N.6.
3. Reason for initiation: To effect liaison between industry and education. Like to develop syllabuses in the light of experience as gained above.

PRESENT COMMERCIAL AFFILIATIONS: None.

PURPOSES AND OBJECTIVES: See Section F. Among many experiments being conducted are: attempts to modernize the structure of advanced school mathematics exams; to introduce statistics as a serious and respectable school subject; to introduce computers and computing into the schools.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: (Not answered).

J. ORIENTATIONS OF STATED OBJECTIVES: (Not answered).

K. LOCATION OF LIST OF OBJECTIVES: (Not answered).

L. SPECIFIC SUBJECTS, GRADE AND AGE LEVELS: Mathematics only; A/S levels (with also an additional mathematics exam at 'O' level); roughly 15+ years.

M. DESCRIPTION OF MATERIALS ALREADY PRODUCED: Books, as follows:
1. Vectors and Matrices, Neill & Moaher (Olive & Boyd).
2. Probability, with Application to Statistics, Moaher (Macmillan).
3. Straightening the Crooked, Goldstein (Olive & Boyd). Exercises in computing for boys and girls.

Also:
4. Specimen papers at O/A/S levels.
5. Syllabus A/S levels.
6. Industrial Report 1966.

N. MATERIALS AVAILABLE FREE: Items 4-6.

O. MATERIALS PURCHASABLE: Items 1-3 (they are not yet published in permanent book form).

P. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

Q. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: None.

R. PROJECT IMPLEMENTATION: (Not answered).

S. PROJECT EVALUATION:

1. Evaluation conducted by: (Not answered).
2. Instruments used: (Not answered).
3. Control groups: Some are being initiated at University College School to analyze the effects of computer education.
4. Feedback process: None as yet.
5. Research evidence of objectives achieved: Nothing very concrete yet, but there has been a significant increase in demand to specialize in mathematics, 'O' level.
6. Availability of evidence: (Not answered).

T. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: (Not answered).

U. PLANS FOR THE FUTURE: To extend activities and publications as above. The object of the Project is to interest and instruct the teacher as well as the pupil and M.E.I. will strive to continue this.

A. PROJECT TITLE: MIDLANDS MATHEMATICS EXPERIMENT (M.M.E.).

B. PROJECT DIRECTOR: Cyril Hope, Worcester College of Education, Henwick Grove, Worcester, U.K. Tel. Worcester 25131.

C. PROJECT HEADQUARTERS:
1. Contact: R. H. Collins, Secretary (M.M.E.), Harold Malley School, Solihull, Warwickshire, U.K.
2. Special facilities or activities available for visitor viewing: Visits to schools.

D. PRINCIPAL PROFESSIONAL STAFF: Cyril Hope, Director; Ray Stokes, Assistant Director (O Level); B.M. Mastrantone, Assistant Director.

E. PROJECT SUPPORT:
1. Organizational sponsorship: Schools Council.
2. Funding agencies: M.M.E. Ltd. (Trust Company holding funds from sale of materials published); Schools Council.

F. PROJECT HISTORY:
1. Principal originators: Cyril Hope and R.H. Collins.
2. Date and place of initiation: September 1, 1961; Harold Malley School.
3. Reason for initiation: New Syllabus in mathematics for General Certificate of Education examination.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PURPOSES AND OBJECTIVES:
1. To provide a sound classroom basis for new topics laying particular emphasis on student-centered approaches.
2. To test in particular vector theory and methods, matrix theory and methods, probability and statistics functionally embedded in a selection of traditional topics as a basis for a mathematical education for everyone to the age of 16.
3. To explore the use of various teaching methods and the possibility of developing the notion of mathematical model stats applied to new and old topics for all ranges of ability.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study; laboratory investigations; lectures; seminars; discussion groups.

J. ORIENTATIONS OF STATED OBJECTIVES: Content mastery; process acquisition; attitudinal changes; scientific literacy; career guidance; free discussion of mathematical ideas with a view to studying pupil's problems as opposed to those devised by teachers.

K. LOCATION OF LIST OF OBJECTIVES: M.M.E. 1st Report 1962-63.

L. SPECIFIC SUBJECTS, GRADE AND AGE LEVELS: Mathematics, ages 11-16, G.C.E. O-level; mathematics, ages 11-16, C.S.E.; mathematical topics for non-examinable children.

M. DESCRIPTION OF MATERIALS ALREADY PRODUCED:
1. 1st Draft textbooks:
a. Midlands Mathematical Experiment (O level) Book I, 1963.

b. Midlands Mathematical Experiment (O level) Book II, 1964.
c. Midlands Mathematical Experiment (O level) Book III, 1965
2. Revised text: Midlands Mathematical Experiment O level Course Book I, 1967 (Part A, first year; Part B, second year).
3. Excursions in Mathematics, 1968.
(Items 1-3 published by Messrs. Geo. G. Harrap & Co. Ltd., High Holbom, London, U.K.)

N. MATERIALS AVAILABLE FREE: None.

O. MATERIALS PURCHASABLE: See Section M.

P. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

Q. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: None.

R. PROJECT IMPLEMENTATION:
1. Number of teachers using materials: Approximately 1,200.
2. Number of students involved: Approximately 120,000.
3. Number of schools involved: 300.
4. Sources of totals in 1, 2, and 3 above: Multiplication of 300 schools by 400 pupils and 300 schools by 4 teachers.
5. Name and location of specific schools where course is being taught: List available from Secretary at address in Section C1.
6. Availability of consultants for teachers: Project directors together with three research assistants working full time from September 1968. Teachers in neighboring schools.
7. Activities conducted for in-service teacher training: Monthly meetings at centers for schools geographically proximate; six Saturday day conferences per year; one 10 day residential conference.
8. Implementation procedures in addition to above: Visits to schools; informational newsletters and memoranda.
9. Implementation procedure, seemingly, the most effective: Personal contact at courses where teachers work.
10. How evaluated: Subjective impressions of teacher attitudes to project.

S. PROJECT EVALUATION:
1. Evaluation conducted by: (Not answered).
2. Instruments used: Public General Certificate of Education Examinations.
3. Control groups: (Not answered).
4. Feedback process: Each teacher comments (adversely or otherwise) on materials suggested and as appropriate criticizes constructively. There is thus a continuous traffic both ways between the central direction and the school.
5. Research evidence of objectives achieved: (Not answered).
6. Availability of evidence: (Not answered).
7. Other pertinent information: The success or otherwise is to be noted in the growth of numbers of schools voluntarily participating.

T. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT:
1. A level course 16-18 being actively taught: September 1966,

first groups in two schools; September 1967, second groups in two schools.

2. Experiments with new topics for low ability groups.

U. PLANS FOR THE FUTURE: Publication of revised texts: November 1968, C.S.E., Volume II; February 1969, O level, Volume II; 1969, A level Courses (G.C.E.). Developing: 1969 Further Mathematics A level Course (G.C.E.); 1968 Further work on mathematics for lower ability pupils; development of teaching aids and new materials for topics in schools.

A. PROJECT TITLE: NUFFIELD A-LEVEL BIOLOGY PROJECT.

B. PROJECT DIRECTOR: P.J. Kelly; W.H. Dowdeswell.

C. PROJECT HEADQUARTERS:
1. Contact: P.J. Kelly, Nuffield A-level Biology Project, Chelsea College, University of London, Pulton Place, London, S.W.6. Tel. 01-736-3401.
2. Special facilities or activities available for visitor viewing: Contact P.J. Kelly.

D. PRINCIPAL PROFESSIONAL STAFF: 1967-1968: P.J. Fry, Materials Co-ordinator; R.E. Lister, Examinations Co-ordinator; J.A. Barker, Rewriter; J.H. Gray, Rewriter; M.K. Sands, Rewriter; C.F. Stoneman, Rewriter.

E. PROJECT SUPPORT:
1. Organization sponsorship: Chelsea College, University of London.
2. Funding agency: Nuffield Foundation.

F. PROJECT HISTORY:
1. Principal originator: (Not answered).
2. Date and place of initiation: January 1, 1965; London.
3. Reason for initiation: Improvement of biological education in secondary schools at the sixth form level.

G. PRESENT COMMERCIAL AFFILIATIONS: Publisher - Penguin Books Ltd.

H. PURPOSES AND OBJECTIVES: Available on application.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study; limited programmed instruction; laboratory investigations; lectures; seminars; discussion groups.

J. ORIENTATIONS OF STATED OBJECTIVES: Content mastery; process acquisition; attitudinal changes; scientific literacy.

K. LOCATION OF LIST OF OBJECTIVES: Preface to Teachers' Guide.

L. SPECIFIC SUBJECTS, GRADE AND AGE LEVELS: Biology; students 16-18 years.

M. DESCRIPTION OF MATERIALS ALREADY PRODUCED: For trial purposes for students: Laboratory guide and study book; problems book; introductory, review and background pamphlets. For trial purposes for teachers: teachers' guide; laboratory book. For trial purposes for teachers and students: projects book. For trial purposes: materials for practical work; films; apparatus; cultures; slides.

N. MATERIALS AVAILABLE FREE: Reports only available on request.

O. MATERIALS PURCHASABLE: None at present; commercial publication date 1970.

P. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

Q. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: (Not answered).

R. PROJECT IMPLEMENTATION:

1. Number of teachers using materials: 60.
2. Number of students involved: Approximately 700.
3. Number of schools involved: 49.
4. Sources of totals in 1, 2, and 3 above: Sampling details available by request for restricted distribution.
5. Name and location of specific schools where course is being taught: Obtainable on request for restricted distribution.
6. Availability of consultants for teachers: Available, system of area co-ordination throughout country.
7. Activities conducted for in-service teacher training: Three national conferences: lectures. demonstrations, discussions, laboratory practice.
8. Implementation procedures in addition to above: Regular area meetings; visits by full-time staff and area co-ordinators to schools.
9. Implementation procedure, seemingly, the most effective: Under consideration.

S. PROJECT EVALUATION:

1. Evaluation conducted by: P.J. Kelly.
2. Instruments used: Questionnaires, tests, observation visits, group meetings, individual comment.
3. Control groups: None used at present.
4. Feedback process: On request.
5. Research evidence of objectives achieved: At present, for limited distribution only.
6. Availability of evidence: Available on request. At present for limited distribution only.

T. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: January 1967 - July 1967, 1st year trial of materials in schools; September 1967 - July 1968, 2nd year trial of materials in schools; evaluation; preparation of materials and rewriting commenced.

U. PLANS FOR THE FUTURE: On request.

A. PROJECT TITLE: NUFFIELD COMBINED SCIENCE PROJECT.

B. PROJECT DIRECTOR: M.J. Elwell, 138 Hagley Road, Birmingham 16, U.K.

C. PROJECT HEADQUARTERS:
1. Contact: M.J. Elwell, Nuffield Combined Science Project.
2. Special facilities or activities available for visitor viewing: None.

D. PRINCIPAL PROFESSIONAL STAFF: C.D. Bingham, Joint Organizer in a consultant capacity; J. Lance, Development team member; K. Wild, Development team member.

E. PROJECT SUPPORT:
1. Organizational sponsorship: Nuffield Foundation.
2. Funding agency: Nuffield Foundation.

F. PROJECT HISTORY:
1. Principal originators: M.J. Elwell, C.D. Bingham.
2. Date and place of initiation: September 1965; Birmingham, U.K.
3. Reason for initiation: The educational demands to produce a combined science scheme for 11-13 year old children as an alternative to schemes in the separate science subjects.

G. PRESENT COMMERCIAL AFFILIATIONS: Publishers: Longmans-Penguin.

H. PURPOSES AND OBJECTIVES: To produce a scheme adaptable over the whole range of ability in the 11-13 year age range. To ensure that children were actively engaged in working in the laboratory gaining as much first hand experience as possible of science as a method of inquiry. (a) To develop an appreciation of hypothesis formation and testing; (b) to enable concepts to be formed.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study; programmed instruction; laboratory investigations; discussion groups.

J. ORIENTATIONS OF STATED OBJECTIVES: Process acquisition; attitudinal changes.

K. LOCATION OF LIST OF OBJECTIVES: In the introduction to Teacher's Guide I of the final, published edition and restated throughout the Guide at relevant places.

L. SPECIFIC SUBJECTS, GRADE AND AGE LEVELS: (Not answered).

M. DESCRIPTION OF MATERIALS ALREADY PRODUCED:
1. Teacher's Guide 1.
2. Teacher's Guide 2.
3. Pupil's Books 1, 2, 2A, 3, 3A, 4.
4. Apparatus list and guide.

N. MATERIALS AVAILABLE FREE: Materials restricted to trial schools.

O. MATERIALS PURCHASABLE: None.

P. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

Q. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: Not known.

R. PROJECT IMPLEMENTATION:

1. Number of teachers using materials: 80.
2. Number of students involved: 4,000.
3. Number of schools involved: 38.
4. Sources of totals in 1, 2, and 3 above: Analysis of school returns.
5. Name and location of specific schools where course is being taught: Available from the Combined Science office.
6. Availability of consultants for teachers: Not available.
7. Activities conducted for in-service teacher training: Not yet attempted.

S. PROJECT EVALUATION:

1. Evaluation conducted by: (Not answered).
2. Instruments used: (Not answered).
3. Control groups: (Not answered).
4. Feedback process: Trial teachers' comments.
5. Research evidence of objectives achieved: (Not answered).

T. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: Second briefing conference; rewriting Teacher's Guide for publication.

U. PLANS FOR THE FUTURE: Project completion December 1968; publication September 1969 and March 1970.

A. PROJECT TITLE: NUFFIELD FOUNDATION SCIENCE TEACHING PROJECT: ADVANCED LEVEL CHEMISTRY.

B. PROJECT DIRECTOR: E.H. Coulson, Chelsea College of Science and Technology, Pulton Place, London, S.W.6, England. Tel: 01-736-3401.

C. PROJECT HEADQUARTERS:
1. Contact: E.H. Coulson, Nuffield Foundation Science Teaching Project: Advanced Level Chemistry.
2. Special facilities or activities available for visitor viewing: None.

D. PRINCIPAL PROFESSIONAL STAFF: Organizer: E.H. Coulson; Headquarters Team: A.W.B. Aylmer-Kelly, E. Glynn, A.J. Malpas, A.L. Mansell, J.C. Mathews, J.G. Raitt, B.J. Stokes, M.D.W. Vokins.

E. PROJECT SUPPORT: The Nuffield Foundation.

F. PROJECT HISTORY:
1. Principal originator: The Nuffield Foundation.
2. Date and place of initiation: September 1965; London.
3. Reason for initiation: To produce a teaching programme in chemistry.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PURPOSES AND OBJECTIVES: To produce an integrated course in chemistry suitable for (a) a part of general education; (b) a foundation for more advanced work at University level.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study; programmed instruction; laboratory investigations; discussion groups.

J. ORIENTATIONS OF STATED OBJECTIVES: Content mastery; attitudinal changes; scientific literacy.

K. LOCATION OF LIST OF OBJECTIVES: Material not yet available.

L. SPECIFIC SUBJECTS, GRADE AND AGE LEVELS: Chemistry, advanced level, 16-18 years.

M. DESCRIPTION OF MATERIALS ALREADY PRODUCED: None.

N. MATERIALS AVAILABLE FREE: None.

O. MATERIALS PURCHASABLE: None until 1970.

P. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

Q. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: Not known.

R. PROJECT IMPLEMENTATION: Provisional material undergoing trials only at present; 21 schools are involved.

S. PROJECT EVALUATION: No evaluation being undertaken at present.

T. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: (Not

previously reported).

U. PLANS FOR THE FUTURE: Project will finish in September 1968.

A. PROJECT TITLE: NUFFIELD MATHEMATICS TEACHING PROJECT

B. PROJECT DIRECTOR: Geoffrey Matthews, 12 Upper Belgrave Street, London S.W.1., England. Tel. 01-235-5271.

C. PROJECT HEADQUARTERS:
1. Contact: Miss Anthea Roberts, Nuffield Mathematics Teaching Project.
2. Special facilities or activities available for visitor viewing: It is often possible to arrange for a visit to one of the Area Centres or to a school taking part.

D. PRINCIPAL PROFESSIONAL STAFF: Writing team 1967-68: E.A. Albany, Lecturer at College of Education; I. Campbell, Lecturer at College of Education; R.K. Tobias, Teacher in a Secondary School; D.R. Brighton, Teacher in a Secondary Modern School; A.G. Vosper, Lecturer at College of Education.

E. PROJECT SUPPORT:
1. Organizational sponsorships: Nuffield Foundation and Schools Council.
2. Funding agency: Nuffield Foundation.

F. PROJECT HISTORY:
1. Principal originator: Nuffield Foundation.
2. Date and place of initiation: September 1964; London.
3. Reason for initiation: To devise a contemporary approach to mathematics for children from 5 to 13.

G. PRESENT COMMERCIAL AFFILIATIONS: Teachers' Guides are being published by a consortium of John Murray and W. & R. Chambers.

H. PURPOSES AND OBJECTIVES: See F4. It is the first such project in the country for this age-range. Materials are being aimed at teachers rather than children. The teachers discuss and develop the materials at Teachers' Centres (of which in 1968 there are at least 130 involved in the U.K.).

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study; laboratory investigations; each teacher uses a combination of methods including much group work (directed in varying degrees), some project work and a minimum of class instruction.

J. ORIENTATIONS OF STATED OBJECTIVES: Content mastery; process acquisition; attitudinal changes; encouragement of independent thought and experiment so that the children learn to think critically and logically, and if possible creatively.

K. LOCATION OF LIST OF OBJECTIVES: In the Teachers' Guide "I Do and I Understand".

L. SPECIFIC SUBJECTS, GRADE AND AGE LEVELS: Mathematics for children aged 5-13.

M. DESCRIPTION OF MATERIALS ALREADY PRODUCED:
1. Draft Teachers' Guides: Beginnings (1), Computation and Structure (2), Computation and Structure (3), Beginnings ▽1, Shape and Size ▽2, Shape and Size ▽3, Pictorial Representation [1], "I Do

and I understand", How to Build a Pond, Space.
2. Films: "I Do and I understand", 5 B.B.C. programmes Children and Mathematics, and Mathematics and Children.
3. Multiboard.
4. Pandora's Box - a device for partitioning sets.

N. MATERIALS AVAILABLE FREE: None.

O. MATERIALS PURCHASABLE:
1. Teachers' Guides: Mathematics Begins (1), Computation and Structure (2), Beginnings 1, Shape and Size 2, Pictorial Representation 1, "I Do and I Understand", How to Build a Pond, Desk Calculators are now available from John Murray and W. & R. Chambers. Available in U.S.A. from John Wiley.
2. Films: "I Do and I Understand" and Mathematics and Children from Sound Services Ltd., Wilton Crescent, Merton Park, London S.W.19. Children and Mathematics from B.B.C. Enterprises, B.B.C. Television Centre, London W.12.
3. Multiboard from E. Marshall Smith Ltd., 5/9 Church Lane, Romford, Essex.
4. Pandora's Box from Scientific Teaching Apparatus, Colquhoun House, 27/37 Broadwick Street, London W.1.

P. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

Q. LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: Teachers' Guides: Italian, Spanish; Film "I Do and I Understand": Spanish.

R. PROJECT IMPLEMENTATION:
1. Number of teachers using materials: About 13,000.
2. Number of students involved: About 500,00.
3. Number of schools involved: About 2,200.
4. Source of totals in 1,2 and 3 above: On the basis of the number of teachers' centres that we know exist. There are, in fact, many more so that the numbers are an underestimate.
5. Name and location of specific schools where course is being taught: Middle Row Junior Mixed School, London W.10; Grassroyal School, Yeovil.
6. Availability of consultants for teachers: Yes, area organizers and teachers' leaders at the teachers' centres set up by local education authorities throughout the country.
7. Activities conducted for in-service teacher training: In-service training both in school hours and in the evenings is carried on at the centres.
8. Implementation procedures in addition to above: Teachers are invited to the centres to discuss any problems they may have, to make up assignment cards, to have practical sessions, to look at equipment and to see films.
9. Implementation procedure seemingly the most effective: A combination of all three.
10. How evaluated: Not applicable. The implementation is a process integrated by each local education authority.

S. PROJECT EVALUATION:

1. Evaluation conducted by: The Schools Council and the members of the Project team.
2. Instruments used: Questionnaires, reports and personal liason leading to revision of the materials. Check-ups, produced in conjunction with the Institut des Sciences de l'Education in Geneva, to see the progress of individual children.
3. Selection of control groups: None used.
4. Feedback process: Information on the viability of the trial editions of the books is collected by the writing team from pilot areas and, in the light of this information, the books are revised before publication. The Schools Council sends out a questionnaire to evaluate the general effect of the project materials.
5. Research evidence of objectives achieved: See Council's Field Report No. 4.
6. Availability of evidence: See 5 above.
7. Other pertinent information: The check-ups are being produced in trial form and will eventually be published in the same way as the Teachers' Guides.

T. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: The writing team has continued to produce guides for trial in the pilot and second-phase areas. Forty continuation-phase areas joined the project in September 1967. They will use the published guides but will set-up centres and attend national and local conferences.

U. PLANS FOR THE FUTURE: The writing team meets roughly once a month for editorial discussions. A conference for representatives from all the areas concerned in the project will be held in April 1968. The main general problem concerning the team in the next year will be the link between primary and secondary schools.

A. PROJECT TITLE: NUFFIELD "O" LEVEL PHYSICS.

B. PROJECT DIRECTOR: Co-ordinator: Prof. K. W. Keohane, Centre for School Education, University of London, Pulton Place, London S.W.6, England. Tel. London, Renown 4301. Organizer: Prof. E. Rogers, Princeton.

C. PROJECT HEADQUARTERS:
1. Contact: Prof. K.W. Keohane, Nuffield "O" Level Physics.
2. Special facilities or activities available for visitor viewing: The project is now complete but continuation activities are being undertaken at Headquarters.

D. PRINCIPAL PROFESSIONAL STAFF: E. Rogers, J. Lewis, E. Wenham.

E. PROJECT SUPPORT: Nuffield Foundation.

F. PROJECT HISTORY:
1. Principal originators: D. Macgill (deceased) and E. Rogers.
2. Date and place of initiation: 1961; London, England.
3. Reason for initiation: Quality of "O" Syllabus.

G. PRESENT COMMERCIAL AFFILIATIONS: (Not answered).

H. PURPOSES AND OBJECTIVES: This project is a five year course of study (two periods per week for first two years, then three periods per week). It uses a high experimental, "discovery" approach.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Laboratory investigations.

J. ORIENTATIONS OF STATED OBJECTIVES: Attitudinal changes; scientific literacy.

K. LOCATION OF LIST OF OBJECTIVES: Volumes I and III of Teacher's Guides.

L. SPECIFIC SUBJECTS, GRADE AND AGE LEVELS: Physics, ages 11-16.

M. DESCRIPTION OF MATERIALS ALREADY PRODUCED:
1. Teacher's Guides I, II, III, IV, and V.
2. Pupil's Question Books I, II, III, IV, and V.
3. Laboratory Guide to Experiments I, II, III, IV, and V.
4. Student Reader; Optics.
5. Guide to Apparatus.

N. MATERIALS AVAILABLE FREE: Brochure only.

O. MATERIALS PURCHASABLE: Items 1-5 available through Longman-Green Penguin Books.

P. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

Q. LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: In process of arranging for translation into Spanish and Swedish.

R. PROJECT IMPLEMENTATION:
1. Number of teachers using materials: Not known.
2. Number of students involved: Not known.

3. Number of schools involved: Not known.
4. Name and location of specific schools where course is being taught: England, Wales, Israel, E. Africa.
5. Availability of consultants for teachers: Available; by arrangement.
6. Activities conducted for in-service teacher training: Many are arranged through English education authorities.
7. Implementation procedures in addition to above: None.
8. Implementation procedure, seemingly, the most effective: In-service programs.
9. How evaluated: Not evaluated.

S. PROJECT EVALUATION:

1. Evaluation conducted by: Schools Council (England).
2. Instruments used: In the process of development.
3. Control groups: Presumably all other schools not engaged in project.
4. Feedback process: Not yet available.
5. Research evidence of objectives achieved: Not quantified but obviously evidence in U.K.

T. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: (Not answered).

U. PLANS FOR THE FUTURE: Rewriting and revision in 1969.

A. PROJECT TITLE: NUFFIELD SCIENCE TEACHING PROJECT: PHYSICAL SCIENCE COURSE.

B. PROJECT DIRECTOR: Dr. J.E. Spice, 12 Kingsgate Street, Winchester, England. Tel. Winchester 5015.

C. PROJECT HEADQUARTERS:
1. Contact: Project director, Nuffield Science Teaching Project: Physical Science Course.
2. Special facilities or activities available for visitor viewing: By arrangement.

D. PRINCIPAL PROFESSIONAL STAFF: B.E. Dawson, H. Derbyshire, D.G.F. Eastwood, A.D.C. Grassie, A.W. Gammage, D.E.P. Hughes, S.W. Hockey, F. McKim.

E. PROJECT SUPPORT: Nuffield Foundation.

F. PROJECT HISTORY:
1. Principal originators: Nuffield Foundation and J.E. Spice.
2. Date and place of initiation: March 1965; London.
3. Reason for initiation: Scientific and curricular reasons.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PURPOSES AND OBJECTIVES: The staff aims to produce an integrated course in physical science which, for those pupils who study it, will replace the last two years of physics and chemistry at school. Virtually all university departments requiring qualifications in physics and/or in chemistry for entrance, have agreed to accept physical science as equivalent. This, in the English educational situation, has considerable advantages from a curricular point of view, since pupils can thus study a wider range of subjects during their last two years at school than otherwise.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study; programmed instruction; laboratory investigations; lectures; seminars; discussion groups.

J. ORIENTATIONS OF STATED OBJECTIVES: Content mastery; process acquisition; attitudinal changes; scientific literacy; career guidance.

K. LOCATION OF LIST OF OBJECTIVES: The list of objectives is implicit throughout the course materials.

L. SPECIFIC SUBJECTS, GRADE AND AGE LEVELS: Physical science: advanced level General Certificate of Education: 15-18.

M. DESCRIPTION OF MATERIALS ALREADY PRODUCED:
1. Teachers' Guide sections 0-VI (twelve more sections to come).
2. Experimental directions, sets of problems, and source material for pupils.
3. Progress reports.

N. MATERIALS AVAILABLE FREE: Progress reports available from project headquarters.

O. MATERIALS PURCHASABLE: Teachers' Guide available in limited numbers. Request from project headquarters.

P. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

Q. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: None.

R. PROJECT IMPLEMENTATION:

1. Number of teachers using materials: About 140.
2. Number of students involved: About 1,100.
3. Number of schools involved: 55 schools and 3 technical colleges.
4. Sources of totals in 1., 2, and 3 above: By simple addition.
5. Name and location of specific schools where course is being taught: The following is a partial list: Arnold School, Blackpool; Atlantic College, Glamorgan; Bletchley Grammar School, Bucks; Broxbourne Grammar School, Herts; Canon Slade Grammar School, Bolton; Cardinal Hinsley Grammar School, Bradford; Charterhouse, Godalming, Surrey; Christ's Hospital, Horsham, Sussex; City of London Girls' School; Cleveland Grammar School, Redcar, Yorks; Dartington Hall, Totnes, Devon; Dauntsey's School, West Lavington, Wilts; Elizabeth College, Gurnsey; Falmouth Grammar School for Boys, Cornwall; Gateway School, Leicester; Gordonstoun School; Handsworth Grammar School, Birmingham; Marlborough College, Wilts; Merchant Taylors' School, Northwood, Middx; Notre Dame High School, Norwich; Nottingham High School; Poole Technical College, Dorset; Queen Eleanor's School, Dunstable, Beds.; St. Edward's School, Oxford; St. Mary's College, Crosby, Lancs.; Shire Oak Grammar School, Walsall Wood, Staffs.; Shrewsbury School; Sir Walter St. John's School, S.W.11; Uppingham School, Rutland; Wellington College, Crowthorne, Berks.; Winchester College; Wolstanton County Grammar School, Newcastle-under-Lyme, Staffs.
6. Availability of consultants for teachers: The physical science group keeps in close touch with all the trial schools.
7. Activities conducted for in-service teacher training: Periodic meetings and discussions are held. Formal courses will begin in about 1 year's time.
8. Implementation procedures in addition to above: None.
9. Implementation procedure, seemingly, the most effective: Small meetings and discussions.
10. How evaluated: By general consensus.

S. PROJECT EVALUATION: The staff has a built-in method of evaluation since all pupils following the physical science course are to take an 'Advanced level' G.C.E. examination in the subject, conducted under the auspices of the Cambridge Local Examinations Syndicate. The first of these examinations will be held in June 1968. Two of the four examiners are members of the physical science group (Messrs. Hughes and Hockey).

T. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: The staff

has continued to write course materials and the staff has established contact with a large number of schools and university departments. The number of centres in which the physical science course is being taught has now risen from 15 to 58.

U. PLANS FOR THE FUTURE: The physical science trials will continue as at present until June 1969. After that the course will still be used in many schools, but less help will be available from the centre. The Teachers' Guide and other course materials are due for publication in the summer of 1970.

A. PROJECT TITLE: NUFFIELD SCIENCE TEACHING PROJECT, SECONDARY SCIENCE SECTION.

B. PROJECT DIRECTOR: Mrs. Hilda Misselbrook, Nuffield Foundation Science Teaching Project, Pulton Place, Fulham, London S.W.6, U.K. Tel. 01-736-3401.

C. PROJECT HEADQUARTERS:
1. Contact: The Organizer, Nuffield Science Teaching Project, Secondary Science Section.
2. Special facilities or activities available for visitor viewing: Discussion with organizer by appointment.

D. PRINCIPAL PROFESSIONAL STAFF: There is a total of 15 team members, two full time at Headquarters, and seven on part time assignments with the rest working in their spare time.

E. PROJECT SUPPORT: Nuffield Foundation.

F. PROJECT HISTORY:
1. Principal originators: Nuffield Foundation following feasability study by Mr. L.G. Smith. Paper prepared by Mr. Smith published by Schools Council as Working Paper No. 1.
2. Date and place of initiation: September 1965; London.
3. Reason for initiation: (Not answered).

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PURPOSES AND OBJECTIVES: Preparation of science teaching material for pupils aged 13-16 years unlikely to take General Certificate of Education "O" level in science. The materials prepared for teachers is based on the ideas of Working Paper No. 1 which are seen to be fundamental for all these pupils; it is developed with an integrated science approach. The material will not constitute a course but a source from which teachers may select and produce courses appropriate for their own pupils. The material has thus to be flexible and capable of adaptation for pupils over a wide range of ability and interests.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study; laboratory investigations; discussion groups.

J. ORIENTATIONS OF STATED OBJECTIVES: Content mastery; process acquisition; attitudinal changes; scientific literacy at a limited level.

K. LOCATION OF LIST OF OBJECTIVES: Within the introduction to each piece of work.

L. SPECIFIC SUBJECTS, GRADE AND AGE LEVELS: Science 13-16 years on General Certificate of Education "O" level.

M. DESCRIPTION OF MATERIALS ALREADY PRODUCED: All material is under trial.

N. MATERIALS AVAILABLE FREE: Working Paper No. 1 from Schools Council.

O. MATERIALS PURCHASABLE: None until Spring 1971.

P. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

Q. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: (Not answered).

R. PROJECT IMPLEMENTATION:

1. Number of teachers using materials: 1967-68 trials, approximately 100; 1968-69 trials, approximately 400.
2. Number of students involved: 1967-68, approximately 2,500-3,000; 1968-69, approximately 10,000-12,000.
3. Number of schools involved: 1967-68 trials, 53; 1968-69 trials, approximately 200.
4. Sources of totals in 1, 2, and 3 above: The staff is in close touch with the trial schools.
5. Name and location of specific schools where course is being taught: (Not answered).
6. Availability of consultants for teachers: Team members visit trial schools for consultation.
7. Activities conducted for in-service teacher training: One week briefing conference for all teachers involved in trials with one day refresher course during trials.
8. Implementation procedures in addition to above: Talks and demonstrations to teachers by team members. These may be at courses arranged by the Department of Education and Science or by London Education Association or at meetings arranged by London Education Association or Science teachers' organizations. At this stage these talks serve to give information about the work of the project and are in no sense training sessions.
9. Implementation procedure, seemingly, the most effective: (Not answered).

S. PROJECT EVALUATION:

1. Evaluation conducted by: No external evaluation as such during trials. Two Her Majesty's Inspectors are attached to the team as observers and report on the trial situation in the schools.
2. Instruments used: (Not answered).
3. Control groups: (Not answered).
4. Feedback process: Detailed item feedback forms are returned by the teachers at the end of each section. (This varies from a week's to a month's work). A very full questionnaire was completed at the end of the first term's work.
5. Research evidence of objectives achieved: (Not answered).
6. Availability of evidence: None available.

T. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: (Not previously reported).

U. PLANS FOR THE FUTURE: Briefing conferences, July 1968, for 1968-69 trials teachers; article in School Science Review, March 1968; publication, spring 1971.

A. PROJECT TITLE: PSYCHOLOGY AND MATHEMATICS PROJECT (Ps. M. P.).

B. PROJECT DIRECTOR: Richard R. Skemp, Child Study Unit, University of Manchester, Manchester 13, England. Tel. 061-ARD-3333, ext. 325.

C. PROJECT HEADQUARTERS:
1. Contact: Mr. J.S. Friis, Ps. M. P., Leicestershire Education Department, County Hall, Glenfield, Leicester LE 3 8RF. Tel. OLE3-871313.
2. Special facilities or activities available for visitor viewing: By arrangement with Mr. Friis.

D. PRINCIPAL PROFESSIONAL STAFF: Mr. J.S. Friis, Mathematics Adviser to the Leicestershire Education Department, Project organizer.

E. PROJECT SUPPORT:
1. Organizational sponsorship: None.
2. Funding agency: None.

F. PROJECT HISTORY:
1. Principal originator: Richard R. Skemp.
2. Date and place of initiation: September, 1962; Leicestershire England.
3. Reason for initiation: See Section H.

G. PRESENT COMMERCIAL AFFILIATIONS: (Not answered).

H. PURPOSES AND OBJECTIVES: Application of on-going psychological research to the learning and teaching of mathematics. A combined honours school of Psychology with Mathematics at Manchester University aims at an interdisciplinary approach, results of which are applied experimentally in Leicestershire schools, and then embodied in generally available text.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Normal classroom procedures.

J. ORIENTATIONS OF STATED OBJECTIVES: Content mastery.

K. LOCATION OF LIST OF OBJECTIVES: See M1.

L. SPECIFIC SUBJECTS, GRADE AND AGE LEVELS: Mathematics, English Secondary School years 1 to 5, ages 12-16 years.

M. DESCRIPTION OF MATERIALS ALREADY PRODUCED:
1. The Psychology of Learning and Teaching Mathematics.
2. Understanding Mathematics, Books 1, 2, 3, 4T, 4M, 5.
3. Teacher's notes for all M2.

N. MATERIALS AVAILABLE FREE: Item 1 from Dr. Skemp, University of Manchester.

O. MATERIALS PURCHASABLE: Items 2 and 3 from University of London Press Ltd., Saint Paul's House, Warwick Square, London, E.C.4., England.

P. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

Q. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: None.

R. PROJECT IMPLEMENTATION:

1. Number of teachers using text: Not known, since text is used widely outside Leicestershire.
2. Name and location of specific schools where course is being taught: Too many schools to single out a few.
3. Availability of consultants for teachers: Not available.
4. Activities conducted for in-service teacher training: Regular area meetings in Leicestershire.

S. PROJECT EVALUATION: Regret evaluation confined to subjective impressions of teachers and students. Pressure of producing material, research, and organization has not allowed time for more precise methods.

T. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: (Not answered).

U. PLANS FOR THE FUTURE: When Book 5 M is completed, the whole series will be revised in the light of 7 years use in schools.

A. PROJECT TITLE: THE SCHOOL MATHEMATICS PROJECT (S.M.P.).

B. PROJECT DIRECTOR: Dr. Bryan Thwaites, Westfield College, University of London, London, N.W.3, England. Tel. 01-435-7601.

C. PROJECT HEADQUARTERS:
1. Contact: Director, S.M.P.
2. Special facilities or activities available for visitor viewing: Visitors are guided to whichever school is most appropriate to their special interests.

D. PRINCIPAL PROFESSIONAL STAFF: H. Martyn Cundy, Deputy Director; P.G. Bowie, Editor; E.K. Evans, Editorial Assistant; A. Freeman, Administrative Assistant.

E. PROJECT SUPPORT:
1. Organizational sponsorship: The Project is an independent trust.
2. Funding agencies: Over the first seven years of the Project funds were granted from industry and certain charitable trusts. The Project is now self-supporting.

F. PROJECT HISTORY:
1. Principal originators: B. Thwaites, T.A. Jones, D.A. Quadling, H.M. Cundy, T.D. Morris.
2. Date and place of initiation: 1961; Southampton University.
3. Reason for initiation: To effect a revolution in mathematics in British Secondary Schools.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PURPOSES AND OBJECTIVES: The purpose of the Project was to produce Pupil's Texts and Teacher's Guides for Grades V to XII in English Grammar Schools, that is, for the upper quarter of the School population. It is unique in that it brought together a team of school mathematical teachers of outstanding ability to construct the curriculum and write the materials. It is unique, too, in that the use of its materials has spread at a very great rate.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: More or less conventional classroom methods.

J. ORIENTATIONS OF STATED OBJECTIVES: A firm understanding of the fundamentals of mathematics as interpreted by British teaching mathematicians with particular reference to the uses of mathematics in a technological society.

K. LOCATION OF LIST OF OBJECTIVES: (Not answered).

L. SPECIFIC SUBJECTS, GRADE AND AGE LEVELS: Mathematics, Grades V to XII, ages 11-18.

M. DESCRIPTION OF MATERIALS ALREADY PRODUCED:
1. Ages 11-16, Books I, II and II and Teacher's Guides.
2. Ages 16-18, Advanced Mathematics Books I and II.
3. Annual Directors Reports, giving a full description of the work of the Project.

4. Various other publications. All S.M.P. books are published by the Cambridge University Press, Cambridge, England, from whom full details can be obtained at any time.
5. Books I to III of the East African S.M.P.
6. Book I of the Far Eastern Edition of S.M.P.

N. MATERIALS AVAILABLE FREE: None.

O. MATERIALS PURCHASABLE: All those mentioned in Section M through any bookshop.

P. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

Q. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: (Not answered).

R. PROJECT IMPLEMENTATION:
1. Number of teachers using materials: About 1,000.
2. Number of students involved: About 50,000.
3. Number of schools involved: About 500.
4. Sources of totals in 1, 2, and 3 above: Intelligent guesswork based upon numbers of copies of books sold.
5. Name and location of specific schools where course is being taught: Invidious to mention any particular schools; reference should be made to the Director for specific information.
6. Availability of consultants for teachers: The professional staff named under Section D.
7. Activities conducted for in-service teacher training: Nine 4-day conferences each year.

S. PROJECT EVALUATION:
1. Evaluation conducted by: The material is evaluated continuously by a central group of some 30 teachers.
2. Instruments used: The subjective judgment of the teachers in the classroom.
3. Control groups: None used.
4. Feedback process: See S1 above.
5. Research evidence of objectives achieved: The subjective evidence is very strong.
6. Availability of evidence: By meeting teachers using the materials.

T. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: (Not answered).

U. PLANS FOR THE FUTURE: (Not answered).

A. PROJECT TITLE: THE SHROPSHIRE MATHEMATICS EXPERIMENT (SME).

B. PROJECT DIRECTOR: R.S. Heritage, 37 Heath End Road, Alsager, Stoke on Trent, Staffordshire, England. Tel. Alsager 2963.

C. PROJECT HEADQUARTERS:
1. Contact: Project director, SME.
2. Special facilities or activities available for visitor viewing: School visits possible by arrangement with the director.

D. PRINCIPAL PROFESSIONAL STAFF: Director: R.S. Heritage, Department of Mathematics, Alsager College of Education; adviser: I.R. Vesselo, Editor, Penguin Books Ltd.; local authority liaison: D. Venvell, Shropshire Education Authority.

E. PROJECT SUPPORT:
1. Organizational sponsorship: Shropshire County Education Authority.
2. Funding agencies: Local education authority subsidizes initial purchase of texts by schools. Publishers subsidize some texts in order to keep costs down. No other funds are used.

F. PROJECT HISTORY:
1. Principal originators: Director: I.R. Vesselo (Penguin Books); Mr. R.D. Price (local education authority).
2. Date and place of initiation: Summer 1964; Shrewsbury Technical College, Shropshire.
3. Reason for initiation: Teachers of county felt need for curriculum development in mathematics. Project initiated to satisfy this need.

G. PRESENT COMMERCIAL AFFILIATIONS: Penguin Books Ltd., Harmondsworth, Middlesex, England.

H. PURPOSES AND OBJECTIVES: Aim: to improve school mathematics by developing (a) teaching methods; (b) the language of mathematical communication; (c) the content of the syllabus. The project began by working within a traditional syllabus with a known end-product, but has now begun to introduce balanced change into it. The treatment of the work is 'integrated' but this still allows for alternatives in subject matter and a variety of treatments of subject matter. The project is seen in part as a teacher in-service training program and personal contact is maintained between teachers and between the director and the teachers at all times. Criticisms, suggestions and comments from teachers are always welcome and are taken into account in every way possible. The project is teacher-centered and pupil-centered rather than director-centered. The planning of the work also takes into consideration the pupil's psychological needs and differs from traditional British syllabuses considerably on this account. There is an attempt at precision in the work and language of the pupil, at logical reasoning (without the kind of rigour which is psychologically undesirable)

and the processes of thought in learning are almost entirely discovery methods. (The texts consist almost wholly of questions.) There is a gradual progression in the published texts towards much more open-ended work than has hitherto been the case in traditional teaching. The staff has thought it undesirable in the first instance to impose too great a change upon teachers: thus much of the work is at present traditional even where viable modern alternatives exist. These alternatives are due to become available during the next few sessions.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Class/group/individual discovery sessions in which discussion and independent study figure.

J. ORIENTATIONS OF STATED OBJECTIVES: Content mastery; attitudinal changes; mathematical literacy.

K. LOCATION OF LIST OF OBJECTIVES: Teachers' Handbook to Books 3 & 4.

L. SPECIFIC SUBJECTS, GRADE AND AGE LEVELS: Mathematics, Secondary Stage, 11-16 years.

M. DESCRIPTION OF MATERIALS ALREADY PRODUCED:
1. Learning Mathematics, Book 1 (Revised).
2. Learning Mathematics, Book 2 (Revised).
3. Learning Mathematics, Book 3 (Revised) (1968).
4. Learning Mathematics, Book 4 (Test).
5. Learning Mathematics, Book 3M (Final) (1968).
6. Teachers' Book to Books 1 and 2.
7. Answers to Books 1 and 2 (1968).

N. MATERIALS AVAILABLE FREE: Director's Report 1967, from the project director.

O. MATERIALS PURCHASABLE: From Penguin Books Ltd., Horton Road, West Drayton, Middlesex: Items 1-5, 9/6d; Item 6, 12/6d; Item 7, 3/6d.

P. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

Q. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: (Not answered).

R. PROJECT IMPLEMENTATION:
1. Number of teachers using materials: 60 within the project.
2. Number of students involved: 8,000 (approximately) within the project area.
3. Number of schools involved: 40 within the project area.
4. Sources of totals in 1, 2, and 3 above: Close approximation.
5. Name and location of specific schools where course is being taught: Cheobury Mortimer: Secondary Modern School; St. Martins: Secondary Modern School; Dawley: Phoenix Comprehensive School; Shrewsbury: High School for Girls.
6. Availability of consultants for teachers: Director is available on short notice.
7. Activities conducted for in-service teacher training: General meetings are held twice a term (6 times a year).

Courses and "workshops" are run in this time. Initially meetings were weekly.
8. Implementation procedures in addition to above: Director maintains personal contact with the teachers concerned and visits schools.
9. Implementation procedure, seemingly, the most effective: Personal contact.
10. How evaluated: Subjective judgment.

S. PROJECT EVALUATION:
1. Evaluation conducted by: The director.
2. Instruments used: Tests compiled within the experiment. (Modified lead tests.)
3. Control groups: It is not intended to use any; control groups exist within the county if they are needed.
4. Feedback process: (Not answered).
5. Research evidence of objectives achieved: A preliminary trial was run in 1964-1965.
6. Availability of evidence: Item R5; on application to the director.
7. Other pertinent information: Results of other evaluation work will not be available until 1969.

T. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: Syllabuses proposed: CSE Syllabus, mode 2 (West Midlands Board); Draft GCE Syllabus 'C'.

U. PLANS FOR THE FUTURE: 1968, in order to cover GCE Syllabus 'C' requirements further texts will be produced (books); 1968, a second series for CSE pupils has been begun (3M) and will be continued with 4M; 1968, the staff also intends to develop material for the less-able; 1968, tentative proposals for A-level work will be considered.

A. PROJECT TITLE: WORKING PARTY FOR SECONDARY SCHOOL SCIENCE.

B. PROJECT DIRECTOR: A.J. Mee, Chairman of the Working Party, Scottish Education Department, St. Andrew's House, Edinburgh, 1, Scotland. Tel. 031-556-6591.

C. PROJECT HEADQUARTERS:
1. Contact: A.J. Mee, Working Party for Secondary School Science.
2. Special facilities or activities available for visitor viewing: Arrangements can be made to show visitors the school science departments where the scheme is being tried out.

D. PRINCIPAL PROFESSIONAL STAFF: H.M. Inspectors of Schools: W.R. Ritchie, A.W. Jeffrey, S.T.S. Skillen; Science Supervisor Renfrewshire, I. Halliday; Science Supervisor Glasgow, J. Gemmell; Science Supervisor Edinburgh, J.R. Barr.

E. PROJECT SUPPORT: The project is administered financially by the Scottish Education Department.

F. PROJECT HISTORY:
1. Principal originator: Scottish Education Department.
2. Date and place of initiation: February 1965; Edinburgh.
3. Reason for initiation: Initially to prepare a syllabus for pupils not aiming at the Scottish Certificate of Education, based on the alternative syllabuses in physics and chemistry.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PURPOSES AND OBJECTIVES: As stated in F4, the purpose of the project was initially to prepare a syllabus for pupils not arriving at the Scottish Certificate of Education. This was to be based on the alternative syllabuses in physics and chemistry for the Scottish Certificate of Education which have now been adopted by all secondary schools in Scotland. The purpose has now been widened to include the production of a common science syllabus for all pupils in the first two years of a secondary course in comprehensive schools.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Laboratory investigations; lectures; discussion groups; work sheets.

J. ORIENTATIONS OF STATED OBJECTIVES: Content mastery; process acquisition; attitudinal changes; scientific literacy; career guidance.

K. LOCATION OF LIST OF OBJECTIVES: In the report of the Working Party, which has not yet been published.

L. SPECIFIC SUBJECTS, GRADE AND AGE LEVELS: Physics, chemistry, biology; Ages 12-16.

M. DESCRIPTION OF MATERIALS ALREADY PRODUCED:
1. Syllabus for first two years.
2. Syllabuses in specific topics for years three and four.
3. Equipment lists prepared by Scottish Schools Science Equipment Research Centre.

4. Work sheets to cover the major part of the first two years' work.
5. Film entitled "Science for the Seventies".

N. MATERIALS AVAILABLE FREE: Items 1, 2, and 4 from Scottish Education Department, St. Andrew's House, Edinburgh, 1. Item 3 from Scottish Schools Science Equipment Research Centre, 103 Broughton Street, Edinburgh,1.

O. MATERIALS PURCHASABLE: Item 5 from Scottish Central Film Library, 16/17 Woodwise Terrace, Glasgow, C.3.

P. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

Q. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: None.

R. PROJECT IMPLEMENTATION:
1. Number of teachers using materials: About 250.
2. Number of students involved: 4,000.
3. Number of schools involved: 120.
4. Sources of totals in 1, 2, and 3 above: 120 pilot schools were chosen to try out the scheme.
5. Name and location of specific schools where course is being taught: The pilot schools are located all over Scotland. The following are a few selected schools: Balwearie High School, Kirkcaldy, Fife; Riverside Secondary School, Stirling; Liberton Secondary School, Edinburgh; Waverley Secondary School, Glasgow.
6. Availability of consultants for teachers: Members of the Working Party act as consultants throughout Scotland.
7. Activities conducted for in-service teacher training: The Colleges of Education have conducted vacation courses. Local Science Associations hold meetings at which topics in the course are sometimes discussed.

S. PROJECT EVALUATION:
1. Evaluation conducted by: The teachers who are piloting the scheme report on its effectiveness at all stages.
2. Instruments used: (Not answered).
3. Control groups: (Not answered).
4. Feedback process: Written reports are sent in by teachers. Visits are paid to schools by H.M. Inspectors involved in the work.
5. Research evidence of objectives achieved: None.
6. Availability of evidence: The scheme will not be made public until all comments by the teachers taking part have been considered.

T. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: (Not previously reported).

U. PLANS FOR THE FUTURE: It is hoped that the Working Party's report will be published in September 1968.

A. PROJECT TITLE: SWANSEA SCHEME.

B. PROJECT DIRECTOR: Professor J. D. Weston, Department of Pure Mathematics, University College, SWANSEA, Glam., U.K. Tel. Swansea 25678.

C. PROJECT HEADQUARTERS:
1. Contact: Professor J. D. Weston, SWANSEA Scheme.
2. Special facilities or activities available for visitor viewing: None; but arrangements can be made.

D. PRINCIPAL PROFESSIONAL STAFF: J.D. Weston, Professor; M.T. McGregor, Lecturer.

E. PROJECT SUPPORT:
1. Organizational sponsorship: None.
2. Funding agency: None.

F. PROJECT HISTORY:
1. Principal originator: Professor J. D. Weston.
2. Date and place of initiation: 1963; Department of Pure Mathematics, University College of Swansea.
3. Reason for initiation: To devise a new Pure Mathematics (A-level) Syllabus which would reflect the logical accuracy of the subject and introduce the pupil to axiomatic theory.

G. PRESENT COMMERCIAL AFFILIATIONS: (Not answered).

H. PURPOSES AND OBJECTIVES: The chief purpose of the Swansea scheme is to demonstrate that, 'with suitable presentation, topics can be treated with logical accuracy in the sixth form to a far greater extent than is usual at present, and consequently that pupils can be given a better understanding of the nature of mathematics than has hitherto been possible'.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Lectures; discussion groups.

J. ORIENTATIONS OF STATED OBJECTIVES: Content mastery; process acquisition; attitudinal changes; scientific literacy; an appreciation of the nature of mathematics and of precise mathematical reasoning.

K. LOCATION OF LIST OF OBJECTIVES: In the content of the syllabus.

L. SPECIFIC SUBJECTS, GRADE AND AGE LEVELS: Pure Mathematics, A-level, 16-18 years.

M. DESCRIPTION OF MATERIALS ALREADY PRODUCED:
1. J.D. Weston, Notes on the circular functions, second edition (University College of Swansea, 1966).
2. J.D. Weston and H.J. Godwin, Some Exercises in Pure Mathematics with expository comments (Cambridge University Press, 1968).

N. MATERIALS AVAILABLE FREE: None at present.

O. MATERIALS PURCHASABLE: Item 1 at a price of 3s.0d., Source: The Singleton Bookshop SWANSEA, Glam., U.K.; Item 2, price

not yet fixed, Source: any bookseller (after September 1968).

P. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

Q. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: None as yet; Spanish is being considered.

R. PROJECT IMPLEMENTATION:

1. Number of teachers using materials: About 40.
2. Number of students involved: About 30.
3. Number of schools involved: 2 at present.
4. Sources of totals in 1, 2, and 3 above: There are about 40 teachers attending courses on the project, and two schools prepare about 30 candidates for examination on the syllabus.
5. Name and location of specific schools where course is being taught: Amman Valley Grammar School, Ammanford, Carmarthenshire, Wales; Bishop Gore Grammar School, Swansea, Wales.
6. Availability of consultants for teachers: Available through persons mentioned in Section D.
7. Activities conducted for in-service teacher training: Two study-groups have been initiated; one group meets in the Department of Pure Mathematics, University College of Swansea, the other at Trinity College, Carmarthen. Members of each study-group receive careful instruction on the presentation and content of the alternative syllabus.

S. PROJECT EVALUATION:

1. Evaluation conducted by: No formal arrangement, other than the A-level examinations.
2. Instruments used: See 1.
3. Control groups: Not in a formal sense.
4. Feedback process: Informal.
5. Research evidence of objectives achieved: Examination results, teachers' reports, university performance of pupils.
6. Availability of evidence: Detailed information is confidential at present.

T. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: The two study groups have continued to meet, and interest in the scheme has become more widespread.

U. PLANS FOR THE FUTURE: The study-group will continue to meet regularly, and it is envisaged that a number of schools will, in the near future, participate more fully in the scheme and present candidates for examination on the alternative syllabus.

A. PROJECT TITLE: ENSEÑANZA DE CIENCIAS (SCIENCE TEACHING).

B. PROJECT DIRECTOR: Prof. Mesias Huaringa Ricci, Mision de la UNESCO, 4a Avenue No. 124, Tegucicalpa P.C., Honduras.

C. PROJECT HEADQUARTERS:
1. Contact: Prof. G. Burkhardt, Enseñanza de Ciencias, Department for the Advancement of Science, UNESCO, Place de Fontenoy, Paris 7e, France.
2. Special facilities or activities available for visitor viewing: (Not answered).

D. PRINCIPAL PROFESSIONAL STAFF: (Not answered).

E. PROJECT SUPPORT: UNESCO.

F. PROJECT HISTORY:
1. Principal originator: Mesias Huaringa Ricci.
2. Date and place of initiation: 1962; Tegucicalpa, Honduras.
3. Reason for initiation: The government of Honduras asked for help in this area.

G. PRESENT COMMERCIAL AFFILIATIONS: (Not answered).

H. PURPOSES AND OBJECTIVES: To organize physics laboratories with inexpensive apparatus or with apparatus built from surplus materials. In the secondary schools, apparatus is for students while in the elementary school it is for teachers. The equipment which has been built, the laboratory guides and other sources have made possible the organization of laboratory sessions in which students have made observations, experiments, measurements and have finally come to conclusions.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study; programmed instruction; lectures; seminars; discussion groups.

J. ORIENTATIONS OF STATED OBJECTIVES: Content mastery; process acquisition; attitudinal changes; scientific literacy; career guidance.

K. LOCATION OF LIST OF OBJECTIVES: (Not answered).

L. SPECIFIC SUBJECTS, GRADE AND AGE LEVELS: Physics and chemistry in secondary school, ages 15-18; physics, mathematics and biology for elementary teachers.

M. DESCRIPTION OF MATERIALS ALREADY PRODUCED: Materials for secondary and primary levels have been produced.

N. MATERIALS AVAILABLE FREE: Easily constructed materials.

O. MATERIALS PURCHASABLE: An equipment list is available from Fisher and Vellve.

P. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: Spanish.

Q. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: (Not answered).

R. PROJECT IMPLEMENTATION:

1. Number of teachers using materials: 78.
2. Number of students involved: 5,600.
3. Number of schools involved: 30.
4. Sources of totals in 1, 2, and 3 above: Actual count.
5. Name and location of specific schools where course is being taught: The following is a partial listing: In Honduras: Escuela Normal "Pedro Nufio", Tegucigalpa, D.C.; Escuela Normal de Señoritas, Tegucigalpa, D.C.; Escuela Normal "John F. Kennedy", San Francisco, Atlantida; Escuela Normal de Occidente, La Esperanza, Intibuca; Instituto Sagrado Corazon, Puerto Cortes; Instituto "Espiritu del Siglo", Trujillo; Instituto Triunfo de la Cruz, Tela; Instituto "Alejandro Flores", El Paraiso; Instituto "Lempira", San Marcos de Colon. In El Salvador: Escuela Normal España, San Salvador; Escuela Normal "Gral. Gerardo Barrios", Santa Ana.; Escuela Normal "Francisco Gavidia", San Miguel. In Nicaragua: Escuela Normal de Varones "Franklin D. Roosevelt", Jinotepe, Nicaragua. In Costa Rica: Facultad de Educacion, Universidad de Costa Rica.
6. Availability of consultants for teachers: (Not answered).
7. Activities conducted for in-service teacher training: Training courses are held, generally each year to implement, study methods of keeping apparatus up-to-date and to modify some laboratory experiments.
8. Implementation procedures in addition to above: Each year a supervisory visit is made to cooperate with teachers in charge of the laboratories in solving any problems which have arisen.
9. Implementation procedure, seemingly, the most effective: Indubitably the seminars and training courses where actual laboratories performed by the teachers, followed by a discussion give the most ample coverage to the topics treated.
10. How evaluated: By means of inquiries at the end of seminars and by visits to teachers in their classrooms.

S. PROJECT EVALUATION: (Not answered).

T. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: (Not answered).

U. PLANS FOR THE FUTURE: This project, begun as a national endeavor in Honduras, will become a Central American project.

A. PROJECT TITLE: EXPERIMENTAL PROJECT ON TEACHING OF SCIENCE AND MATHEMATICS AT THE MIDDLE SCHOOL STAGE.

B. PROJECT DIRECTOR: Dr. R. N. Rai, Head of the Department, Department of Science Education, National Council of Educational Research & Training, N.I.E. Bldgs., Mehrauli Road, New Delhi-16, India. Tel. 7-7601.

C. PROJECT HEADQUARTERS:

1. Contact: Dr. M.C. Pant, Experimental Project on Teaching of Science and Mathematics at the Middle School Stage, Professor of Science Education, National Council of Educational Research & Training, N.I.E. Bldgs., Mehrauli Road, New Delhi-16, India. Tel. 7-8498.
2. Special facilities or activities available for visitor viewing: A visit to the Central Science Workshop of the Department developing new science equipment for the use under the project, a visit to the experimental schools and the demonstration school and examination of the printed instructional materials.

D. PRINCIPAL PROFESSIONAL STAFF: Physics: R.N. Rai, N. Mitra, K.J. Khurana, Chotan Singh, and H.L. Sharma; chemistry: M.C. Pant, N.K. Sanyal, C. Radhakrishnan, K.C. Mathur, and K.S. Bhandari; biology: Rajendra Prasad, S. Doraiswami, L. Laxmanan, C. Raju, S.P. Sharma, S. Majumdar, and K.B. Gupta; mathematics: R.C. Sharma, B.P. Pande, and Rameshwar Dayal; central science workshop: D.S. Rao, A.P. Verma, and S.P. Dua. UNESCO experts working on this project: leader: S.A. Balezin; biology: V.I. Galakhov, and V. Galushin; chemistry: Y.I. Naumov and L.V. Levchuk; physics: A.A. Margolis and A. Tamarin; mathematics: B. Brared; workshop: B. Bukhalov; interpreter: R.A. Abul Khanov.

E. PROJECT SUPPORT: National Council of Educational Research & Training, New Delhi and UNESCO.

F. PROJECT HISTORY:

1. Principal originator: Department of Science Education, National Council of Educational Research & Training, New Delhi.
2. Date and place of initiation: September 1965; Delhi.
3. Reason for initiation: To undertake a pilot study for developing curricular materials for an improved science and mathematics instruction at the middle stage of the secondary school as recommended by the UNESCO Planning Mission.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PURPOSES AND OBJECTIVES: The general science approach to the teaching of science which is at present followed at the middle school stage in Indian schools has not proved successful due to a number of reasons. The standards of attainment at the end of the secondary school in science and mathematics subjects has remained rather low as compared to the developed countries.

With a view to remedying the above defects and to achieving higher standards of science and mathematics instruction at the secondary stage, a new programme of teaching science as individual disciplines has been attempted under this project: to develop a compulsory course of science and mathematics for all the students at the middle stage of school education; to develop new syllabi, text materials, teachers' guide, laboratory experiments and equipment for teaching science as individua disciplines of physics, chemistry, biology and mathematics from the very beginning of the middle stage of school education instead of the present programme of teaching science as an integrated course of "general science"; to develop a complete package programme covering the students text material, curriculum guide, teachers' guide, equipment and laboratory instructions and audio-visual aids; to develop materials for short-term training/refresher courses for teachers to teach effectively the new materials and to conduct pilot training courses.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: (Not answered).

J. ORIENTATIONS OF STATED OBJECTIVES: (Not answered).

K. LOCATION OF LIST OF OBJECTIVES: The published curriculum of the project.

L. SPECIFIC SUBJECTS, GRADE AND AGE LEVELS: Biology, chemistry, mathematics, physics; grades 6-8; age levels 12-14.

M. DESCRIPTION OF MATERIALS ALREADY PRODUCED:

Textbooks:

1. Arithmetic-cum-Algebra Part I for Class VI (Hindi edition).
2. Arithmetic-cum-Algebra Part I for Class VI (English edition).
3. Physics Part I for Class VI (Hindi edition).
4. Physics Part I for Class VI (English edition).
5. Biology Part I for Class VI (Hindi edition).
6. Biology Part I for Class VI (English edition).
7. Geometry Part I for Class VI (Hindi edition).
8. Geometry Part I for Class VI (English edition).

Teachers' Guide:

9. Arithmetic-cum-Algebra Part I (in English).
10. Geometry Part I (in English).
11. Physics Part I (in English).
12. Biology Part I (in English).

Curriculum Guide:

13. Arithmetic-cum-Algebra Part I (in English).
14. Geometry Part I (in English).
15. Physics Part I (in English).
16. Biology Part I (in English).
17. Syllabus of various subjects of the Experimental Project.

Trial Text Materials for Experimental Schools only:

18. Physics for class VII (English edition).
19. Physics for class VII (Hindi edition).

20. Chemistry for class VII (English edition).
21. Chemistry for class VII (Hindi edition).
22. Biology for class VII (Hindi edition).
23. Biology for class VII (English edition).
24. Mathematics I for class VII (Hindi edition).
25. Mathematics I for class VII (English edition).
26. Mathematics II for class VII (English edition).
27. Mathematics II for class VII (Hindi edition).

N. MATERIALS AVAILABLE FREE: Limited copies of all the above publications can be obtained from the project headquarters.

O. MATERIALS PURCHASABLE: Items 1 to 16 are purchasable from the Publication Unit of the National Council of Educational Research & Training at B-31, Maharani Bagh, New Delhi-14 (India).

P. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: Hindi and English.

Q. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: It is expected that the different State Governments might like to adapt these materials and translate them into their regional languages.

R. PROJECT IMPLEMENTATION:

1. Number of teachers using materials: About 75 teachers for the trial materials and over 200 teachers in the schools where the first part is being used on regular basis.
2. Number of students involved: About 2,500 in the experimental schools in Delhi and approximately 6,000 students in 110 central schools where the first part is being used on a regular basis outside Delhi.
3. Number of schools involved: 31 schools for experimental purposes in Delhi and about 110 central schools located in various parts of the country for regular use of Part I of the materials.
4. Sources of totals in 1, 2, and 3 above: The number stated for experimental schools has been actually calculated whereas those in schools outside Delhi are only approximations.
5. Name and location of specific schools where course is being taught: Write to project headquarters for list.
6. Availability of consultants for teachers: Available, periodic meetings with the teachers of experimental schools and visits by the project officers to the schools located in Delhi.
7. Activities conducted for in-service teacher training: The in-service course for the teachers is conducted in the summer vacation for a period of 4 to 5 weeks.
8. Implementation procedures in addition to above: The draft text materials are first tried out in schools and the experience gained from the teachers by observations is utilized to revise the materials into a final textbook.
9. Implementation procedure, seemingly, the most effective: In-service courses and observations for teachers.

S. PROJECT EVALUATION:

1. Evaluation conducted by: Team of experts from UNESCO has made one evaluation of the progress.
2. Instruments used: (Not answered).
3. Control groups: (Not answered).
4. Feedback process: Feedback is obtained by individual observation, report of teachers and the short seminars organized where teachers may take part in discussing improvements.
5. Research evidence of objectives achieved: Not yet collected.

T. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: Further development of materials for Class VII of the third year of the project is now being taken up. The revision of the text materials for the second year, i.e., Class VII has already been completed and sent to press. Guide materials for teachers for the various subjects have already been prepared and are being made ready for printing for use in next school year.

U. PLANS FOR THE FUTURE: By the end of the next year the entire writing programme of the first three years including the guidance materials will be completed and further revision work of the already published materials will be taken up. Steps are being taken for extended trial of the materials in various states of India. From the school year beginning July 1967 the first part of the material is already being used on a regular basis in 110 central schools located all over the country and from July 1968 approximately 400 middle schools of Delhi are planning to introduce the physics and biology programme of this course in Class VI. To be extended in future years to chemistry as planned in the curriculum. The mathematics part of the curriculum will be introduced in Delhi schools beginning July 1969.

A. PROJECT TITLE: ADAPTATION OF THE BSCS YELLOW VERSION AND OTHER BSCS MATERIALS.

B. PROJECT DIRECTORS: Prof. A. Poljakoff-Mayber and Dr. E. Jungwirth, The Hebrew University of Jerusalem, Israel.

C. PROJECT HEADQUARTERS:
1. Contact: Prof. A. Poljakoff-Mayber, Adaptation of the BSCS Yellow Version and other BSCS materials, Head of the Israel Science Teaching Centre, C/O The Hebrew University, Jerusalem, Israel.
2. Special facilities or activities available for visitor viewing: (Not answered).

D. PRINCIPAL PROFESSIONAL STAFF: A. Poljakoff-Mayber, Plant Physiologist; E. Jungwirth, Educator and Evaluator; Z. Lev, M. Chor, and A. Barash, Inspectors; J. Feuchtwanger and M. Regev, Teacher Supervisors in the field.

E. PROJECT SUPPORT:
1. Organizational sponsorships: Faculty of Sciences and the School of Education, The Hebrew University; The Ministry of Education and Culture; Department of Education, Bar-Ilan University.
2. Funding agency: Ministry of Education.

F. PROJECT HISTORY:
1. Principal originator: The Ministry of Education.
2. Date and place of initiation: 1963; The Hebrew University of Jerusalem.
3. Reason for initiation: The need for innovation in the biology curriculum in the high schools of Israel.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PURPOSES AND OBJECTIVES: (Not answered).

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study; laboratory investigations; lectures; discussion groups.

J. ORIENTATIONS OF STATED OBJECTIVES: Content mastery; process acquisition; attitudinal changes; scientific literacy.

K. LOCATION OF LIST OF OBJECTIVES: (Not answered).

L. SPECIFIC SUBJECTS, GRADE AND AGE LEVELS: Biology for the 9th, 10th, 11th, and 12th grades in the academic and agricultural secondary schools. Also materials for 9th and 10th grades for slow learners.

M. DESCRIPTION OF MATERIALS ALREADY PRODUCED: Biology - The Life Science:
II Unity.
III Diversity (Microorganisms).
IV Diversity (Plants).
V Diversity (Animals).
VII Heredity.
VIII Teacher's guide for the above.

N. MATERIALS AVAILABLE FREE: All the materials in Section M available in limited numbers, if not out of print.

O. MATERIALS PURCHASABLE: None.

P. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: Hebrew.

Q. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: None.

R. PROJECT IMPLEMENTATION:

1. Number of teachers using materials: 250.
2. Number of students involved: Approximately 3,500.
3. Number of schools involved: 20.
4. Sources of totals in 1, 2, and 3 above: (Not answered).
5. Name and location of specific schools where course is being taught: May be supplied on special request.
6. Availability of consultants for teachers: Available. Two teachers supervisors visit in the schools. There are monthly meetings, conferences and discussions. There is a supply service of live materials to the experimental schools.
7. Activities conducted for in-service teacher training: Monthly meetings and summer refresher courses.

S. PROJECT EVALUATION:

1. Evaluation conducted by: Dr. Jungwirth, Mr. Feuchtwanger and Mr. Regev.
2. Instruments used: Tests, teachers' reports, supervisors' impressions.
3. Control groups: There are control classes chosen from schools using the ordinary biology curriculum and whose teachers did attend the special BSCS courses.
4. Feedback process: As in Section S2 above.
5. Research evidence of objectives achieved: It is too early to evaluate.

T. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: Materials are being prepared now for the 12th grade, specializing in biology and for 9th and 10th grades for slow learners.

U. PLANS FOR THE FUTURE: (Not answered).

A. PROJECT TITLE: AGRO-BIOLOGY, INTEGRATION OF BIOLOGY AND AGRICULTURE SERVICE FOR THE 9TH AND 10TH GRADES IN AGRICULTURAL AND RURAL SERVICES.

B. PROJECT DIRECTOR: Dr. E. Jungwirth, Head, Dept. Agric. Education Faculty of Agriculture, The Hebrew University of Jerusalem, P.O.B. 12, Rehovot, Israel.

C. PROJECT HEADQUARTERS:
1. Contact: Project Director, Agro-Biology.
2. Special facilities or activities available for visitor viewing: None.

D. PRINCIPAL PROFESSIONAL STAFF: See Section B.

E. PROJECT SUPPORT:
1. Organizational sponsorships: Dept. Agric. Education, Ministry of Education and Culture, Government of Israel.
2. Funding agencies: Dept. Agric. Education; Ministry of Education and Culture, Government of Israel.

F. PROJECT HISTORY:
1. Principal originator: See Section B.
2. Date and place of initiation: 1967.
3. Reason for initiation: Need for revision of curriculum.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PURPOSES AND OBJECTIVES: To achieve maximal integration of biology and basic agricultural science with intent to facilitate maximal transfer, increase skills in application of biological principles in agricultural situations, stimulate motivation for agricultural studies, and positively influence students' choice of agricultural occupations after graduation.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study, laboratory investigations, lectures, discussion groups.

J. ORIENTATIONS OF STATED OBJECTIVES: Content mastery, process acquisition, attitudinal changes, scientific literacy, career guidance.

K. LOCATION OF LIST OF OBJECTIVES: To be included in teachers' materials.

L. SPECIFIC SUBJECTS, GRADE AND AGE LEVELS: 9th grade - agricultural botany (ecological-physiological approach), 10th grade - agricultural zoology.

M. DESCRIPTION OF MATERIALS ALREADY PRODUCED:
1. Agro-Biology I for the 9th grade.
2. Agro-Biology II for the 9th grade.

N. MATERIALS AVAILABLE FREE: Items 1 and 2 from Mr. I. Perliss, Chief Inspector, Department Agric. Education, Ministry of Education, P.O.B. 7036, Tel-Aviv, Israel.

O. MATERIALS PURCHASABLE: None.

P. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: Hebrew.

Q. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: None.

R. PROJECT IMPLEMENTATION:

1. Number of teachers using materials: Pilot run 1967/68 - 5 teachers; trial run 1968/69 - 15 teachers.
2. Number of students involved: Pilot run - 250 1st trial run - 600.
3. Number of schools involved: Pilot run - 5, 1st trial run - 15.
4. Sources of totals in 1, 2, and 3 above: (Not answered).
5. Name and location of specific schools where course is being taught: 1967/68: Kfar Yarok, Secondary Agricultural Boarding School; Ben Shemen, Secondary Agricultural Boarding School; Mikve-Israel, Secondary Agricultural Boarding School; Kanot, Secondary Agricultural Boarding School; Beer-Tuvia Regional Rural School.
6. Availability of consultants for teachers: See Section B.
7. Activities conducted for in-service teacher training: Monthly team-meetings; periodic visits to schools by project director.
8. Implementation procedures in addition to above: (Not answered).

S. PROJECT EVALUATION:

1. Evaluation conducted by: See Section B.
2. Instruments used: Tests.
3. Control groups: None used so far.
4. Feedback process: Monthly reports by teachers; impressions gathered at visits to schools.
5. Research evidence of objectives achieved: None so far.

T. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: (Not previously reported).

U. PLANS FOR THE FUTURE: Teachers' Guide for 9th grade; Agro-Biology III/IV for 10th grade.

A. PROJECT TITLE: EXPERIMENTAL CHEMISTRY PROGRAMME FOR SECONDARY SCHOOLS (REHOVOTH GROUP - CHEMISTRY).

B. PROJECT DIRECTOR: Professor D. Samuel, Isotope Dept., Weizmann Institute of Science, Rehovoth, Israel. Tel. 951-721, ext. 411.

C. PROJECT HEADQUARTERS:
1. Contact: Mrs. Sheila Maor, Experimental Chemistry Programme for Secondary Schools (Rehovoth Group - Chemistry), Rehovoth Chemistry Group, Israel Science Teaching Centre, Feinberg Graduate School, The Weizmann Institute of Science, Rehovoth, Israel.
2. Special facilities or activities available for visitor viewing: Experimental classes using programme materials.

D. PRINCIPAL PROFESSIONAL STAFF: D. Samuel; F. Klein, Scientific Editor; S. Novick, Coordinator; Z. Karp; Y. Zilberstein; A. Hofstein.

E. PROJECT SUPPORT:
1. Organizational sponsorships: Weizmann Institute of Science; Israel Ministry of Education.
2. Funding agencies: Israel Ministry of Education; Weizmann Institute; private donors.

F. PROJECT HISTORY:
1. Principal originators: Committee for the Promotion of the Teaching of Chemistry in Secondary Schools, originally a subcommittee set up by Ministry of Education under chairmanship of Prof. A. de-Shalit.
2. Date and place of initiation: 1965; Rehovoth, Israel.
3. Reason for initiation: Need for introducing modern curricula and teaching methods into Israeli high schools.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PURPOSES AND OBJECTIVES: Basic experimental programme consists of Hebrew translation of "CHEMstudy" text and lab manual, to which will be added specially written chapters on selected topics (such as chemistry of carbon compounds, geochemistry, industrial processes, molecular biology, etc.). Programme will then be revised as a result of experience in pilot project, feedback analysis and success of new curricula in other sciences. Objectives are to develop a lab oriented chemistry course for (senior) high schools designed to develop appreciation and understanding of scientific activity and thinking in chemistry.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Laboratory investigations; discussion groups.

J. ORIENTATIONS OF STATED OBJECTIVES: Content mastery; attitudinal changes; scientific literacy.

K. LOCATION OF LIST OF OBJECTIVES: Introduction (in Hebrew) to text.

L. SPECIFIC SUBJECTS, GRADE AND AGE LEVELS: Chemistry, grades 10-12, 15-18 years old.

M. DESCRIPTION OF MATERIALS ALREADY PRODUCED:
1. Text - Part I (CHEMstudy Chapters 1-3, 11).
2. Laboratory Manual - Part I.
3. Text and laboratory manual - Part II (CHEMstudy Chapter 10).

N. MATERIALS AVAILABLE FREE: Items 1, 2, and 3 - all in Hebrew.

O. MATERIALS PURCHASABLE: None.

P. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: Hebrew.

Q. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: None.

R. PROJECT IMPLEMENTATION:
1. Number of teachers using materials: 40.
2. Number of students involved: 3,000.
3. Number of schools involved: 28.
4. Sources of totals in 1, 2, and 3 above: Reports and inspection.
5. Name and location of specific schools where course is being taught: Herzliyah H.S., Tel-Aviv; Rehovoth H.S.; Rishon le Zion H.S.; Municipal H.S. 4, Tel-Aviv; Kfar Yarok Agricultural H.S.; Pardess Chana Agricultural H.S.; Kibbutz Maoz Hayim H.S.; Kibbutz Kabri H.S.; Bnei Akiva Yeshiva H.S.; Boyar H.S., Jerusalem; Holon H.S.; Beersheba H.S. "Aleph".
6. Availability of consultants for teachers: Periodic visits to schools by project coordinator; monthly evaluation and discussion meetings of all teachers on pilot project.
7. Activities conducted for in-service teacher training: University-based summer institutes.
8. Implementation procedures in addition to above: Periodic demonstration lessons.
9. Implementation procedure, seemingly, the most effective: Summer institute combined with discussion groups.
10. How evaluated: Teacher opinion.

S. PROJECT EVALUATION:
1. Evaluation conducted by: Project staff.
2. Instruments used: Detailed feedback reports; achievement examinations.
3. Control groups: None used.
4. Feedback process: Reports from teachers filed by chapters; periodic evaluation and discussion meetings of all teachers on pilot project.
5. Research evidence of objectives achieved: Increasing interest in project and in chemistry teaching in general. Tendency to change and upgrade university curricula.
6. Availability of evidence: Not yet available.

T. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: Preparation of: Selected chapters in chemistry of carbon compounds;

text and lab manual - Part III (CHEMstudy translation).

U. PLANS FOR THE FUTURE: Completion of 3-year cycle of pilot project by 1969; revision of 3-year programme, 1969-1970; writing of selected chapters on special topics (industrial chemistry, molecular biology, geochemistry, etc.).

A. PROJECT TITLE: EXPERIMENTAL PHYSICS PROGRAMME FOR SECONDARY SCHOOLS.

B. PROJECT DIRECTOR: Professor A. de-Shalit, Director General, The Weizmann Institute of Science, Rehovoth, Israel. Tel. 951721, ext. 2316.

C. PROJECT HEADQUARTERS:

1. Contact: Mrs. S.R. Maor, Experimental Physics Programme for Secondary Schools, Rehovoth Group - Physics, Israel Science Teaching Center, The Weizmann Institute of Science, Rehovoth, Israel.
2. Special facilities or activities available for visitor viewing: Experimental apparatus developed by group on permanent exhibit.

D. PRINCIPAL PROFESSIONAL STAFF: A. de-Shalit, R. Cohen, Z. Geller, H. Goldring, L. Green, R. Harel.

E. PROJECT SUPPORT:

1. Organizational sponsorships: Israel Ministry of Education; the Weizmann Institute of Science.
2. Funding agencies: Israel Ministry of Education, the Weizmann Institute of Science, and other sources.

F. PROJECT HISTORY:

1. Principal originators: Committee for the Promotion of the Teaching of Physics in Secondary Schools, originally a subcommittee set up by the Ministry of Education under the chairmanship of Professor A. de-Shalit.
2. Date and place of initiation: 1964; the Weizmann Institute of Science, Rehovoth, Israel.
3. Reason for initiation: Need for introducing modern curricula into Israeli High Schools.

G. PRESENT COMMERCIAL AFFILIATIONS: Kibbutz Kfar Ruppin - manufacturers of special apparatus developed by Rehovoth Group; Madad, Shderoth - manufacturers of precision thermometers.

H. PURPOSES AND OBJECTIVES: To work out a new general physics programme suitable for grades 9-12 of secondary schools in Israel. The programme will then be revised as a result of experience in a pilot project, feedback analysis and success of new curricula in other sciences.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Laboratory investigations; lectures.

J. ORIENTATIONS OF STATED OBJECTIVES: Process acquisition; attitudinal changes.

K. LOCATION OF LIST OF OBJECTIVES: (Not answered).

L. SPECIFIC SUBJECTS, GRADE AND AGE LEVELS: Grade 9, age 14: fundamental concepts and principles, the general gas law and the kinetic model, calorimetry. Grade 10, age 15: electricity and energy. Grade 11, age 16: mechanics: kinematics and

dynamics, Newton's laws.

M. DESCRIPTION OF MATERIALS ALREADY PRODUCED:
1. Textbook and Laboratory Manual, Introduction to Physics for Grade 9.
2. Laboratory Manual, Introduction to Physics for Grade 10.
3. Textbook and Laboratory Manual, Introduction to Physics for Grade 11.
4. Apparatus and Laboratory kits for use with the above.

N. MATERIALS AVAILABLE FREE: None.

O. MATERIALS PURCHASABLE: All items in section M.

P. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: Hebrew.

Q. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: None.

R. PROJECT IMPLEMENTATION:
1. Number of teachers using materials: 70.
2. Number of students involved: 6,000.
3. Number of schools involved: 43.
4. Sources of totals in 1, 2, and 3 above: (Not answered).
5. Name and location of specific schools where course is being taught: Private and municipal schools in all parts of Israel: cities, villages and cooperative settlements (kibbutzim).
6. Availability of consultants for teachers: Members of the group make regular visits to schools participating in the project.
7. Activities conducted for in-service teacher training: Summer courses, periodic meetings, discussions, etc.; supplementary material circulated throughout school year.
8. Implementation procedures in addition to above: (Not answered).
9. Implementation procedure, seemingly, the most effective: Summer courses and periodic meetings.
10. How evaluated: (Not answered).

S. PROJECT EVALUATION:
1. Evaluation conducted by: The staff.
2. Instruments used: Tests composed by members of the group are given simultaneously in all schools participating in project. Results are computer-analyzed at the Center.
3. Control groups: None used.
4. Feedback process: Teachers are encouraged to send in comments and suggestions on material being taught; textbooks are revised periodically, taking these comments into consideration.
5. Research evidence of objectives achieved: None, the project has been going on for too short a period.

T. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: (Not previously reported).

U. PLANS FOR THE FUTURE: Translation into Hebrew of P.S.S.C. Advanced Topics and P.S.S.C. International Edition.

A. PROJECT TITLE: THE STUDY OF NEW APPROACHES TO THE TEACHING OF ELEMENTARY SCIENCE IN ELEMENTARY SCHOOLS (GRADES I-VI) AND THEIR ADAPTATION TO THE SCHOOLS IN ISRAEL.

B. PROJECT DIRECTOR: M. Feuchtwanger, Tel-Aviv University, Physics Dept., Tel-Aviv, Ramat Aviv, Israel.

C. PROJECT HEADQUARTERS:
1. Contact: M. Feuchtwanger, The Study of New Approaches to the Teaching of Elementary Science.
2. Special facilities or activities available for visitor viewing: None.

D. PRINCIPAL PROFESSIONAL STAFF: M. Feuchtwanger, Project Director; Al. Barash, Assistant Project Director; Rivka Yavin; S. Berlinger, Z. Geller, N. Orpaz, Co-investigators.

E. PROJECT SUPPORT:
1. Organizational sponsorships: The Dept. of Pedagogy, Tel-Aviv University; The Ministry of Education.
2. Funding agencies: Ministry of Education; Department of Health, Education and Welfare, U.S.A.

F. PROJECT HISTORY:
1. Principal originator: Tel-Aviv University.
2. Date and place of initiation: 1966; Tel-Aviv, Israel.
3. Reason for initiation: The present science curriculum for grades K-VI in the schools could no longer fulfill the needs of the diverse population and keep up with recent developments.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PURPOSES AND OBJECTIVES: (Not answered).

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study, laboratory investigations, lectures.

J. ORIENTATIONS OF STATED OBJECTIVES: Process acquisition, attitudinal changes, scientific literacy.

K. LOCATION OF LIST OF OBJECTIVES: (Not answered).

L. SPECIFIC SUBJECTS, GRADE AND AGE LEVELS: Physics, chemistry, biology, K-VI.

M. DESCRIPTION OF MATERIALS ALREADY PRODUCED:
1. Measurement.
2. Seeds.

N. MATERIALS AVAILABLE FREE: Items 1 and 2 available from M. Feuchtwanger, Physics Dept., Tel-Aviv University.

O. MATERIALS PURCHASABLE: None.

P. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: Hebrew.

Q. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: None.

R. PROJECT IMPLEMENTATION: (Not answered).

S. PROJECT EVALUATION: (Not answered).

T. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: Production of materials named in Section M.

U. PLANS FOR THE FUTURE: (Not answered).

A. PROJECT TITLE: THE TEACHING OF MATHEMATICS IN HIGH SCHOOLS.

B. PROJECT DIRECTORS: Prof. S.A. Amitsur, Department of Mathematics, Hebrew University, Jerusalem, Israel; Mr. A. Marcus, Ministry of Education, High School Department, Shivtey Israel Str., Jerusalem, Israel.

C. PROJECT HEADQUARTERS:
1. Contact: Project Directors, The Teaching of Mathematics in High Schools.
2. Special facilities or activities available for visitor viewing: None.

D. PRINCIPAL PROFESSIONAL STAFF: P. Katz; M. Machover; university and high school teachers grouped together to suit each purpose.

E. PROJECT SUPPORT:
1. Organizational sponsorship: Hebrew University, Jerusalem.
2. Funding agency: Ministry of Education, Israel.

F. PROJECT HISTORY:
1. Principal originator: S.A. Amitsur.
2. Date and place of initiation: 1958; Jerusalem, Israel.
3. Reason for initiation: Need for revision of high school curriculum in mathematics to suit needs of higher teaching.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PURPOSES AND OBJECTIVES: Revision of high school curriculum in mathematics. Special features which differ from other projects are: (1) in algebra, translation into algebraic language is developed independently of the technique of solving equations; (2) in calculus, derivation is introduced by linear approximation and a stepwise introduction of the quantifiers in defining the o(1). Axiomatization is introduced in the developing of the elementary functions and integrals. Analytic geometry, as such, is introduced very early; also axiomatic arithmetic and projective geometry.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Lectures.

J. ORIENTATIONS OF STATED OBJECTIVES: Content mastery; attitudinal changes.

K. LOCATION OF LIST OF OBJECTIVES: (Not answered).

L. SPECIFIC SUBJECTS, GRADE AND AGE LEVELS: Algebra, grades 9-10, ages 14-15; calculus, grades 11-12, ages 16-17; probability and statistics, grades 11-12, ages 16-17; two chapters in the foundations of mathematics, grade 12, age 17.

M. DESCRIPTION OF MATERIALS ALREADY PRODUCED:
1. Algebra I. (grade 9-10) written by Mr. A. Erlich.
2. Algebra II. (grade 10) written by Mr. A. Erlich.
3. Chapters in (analytic) Geometry, edited by Mr. A. Erlich.
4. Differential Calculus, written by Mr. Kollber.
5. Probability and Statistics, written by Professor Posner.
6. Axiomatic Arithmetic, written by Dr. M. Machover.

7. Projective Geometry, written by Dr. M. Machover.

N. MATERIALS AVAILABLE FREE: None.

O. MATERIALS PURCHASABLE: The material is distributed only to the schools participating in the experimentation. For other purposes contact Mr. A. Marcus, (Inspector) High School Department, Ministry of Education, Jerusalem, Israel.

P. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: Hebrew.

Q. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: None.

R. PROJECT IMPLEMENTATION:

1. Number of teachers using materials: 37.
2. Number of students involved: Approximately 4,200.
3. Number of schools involved: 11 schools, 133 classes.
4. Sources of totals in 1, 2, and 3 above: Inspector's record.
5. Name and location of specific schools where course is being taught: Tel Aviv region.
6. Availability of consultants for teachers: There is a monthly conference of the teachers concerned with the experiment, under participation of the project directors and of the professional staff.
7. Activities conducted for in-service teacher training: Summer seminars.
8. Implementation procedures in addition to above: Monthly visits in classes.
9. Implementation procedure, seemingly, the most effective: (Not answered).

S. PROJECT EVALUATION:

1. Evaluation conducted by: (Not answered).
2. Instruments used: (Not answered).
3. Control groups: (Not answered).
4. Feedback process: Meetings, once a month with all the teachers. Monthly visits in classes.
5. Research evidence of objectives achieved: None yet.
6. Availability of evidence: Not available.
7. Other pertinent information: Grade distribution curve at the official matriculation exams is closer to normal than that of standard curriculum.

T. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: Books referred to in Sections M1 and M2 are being rewritten. Books referred to in Sections M6 and M7 were written and are taught in 2 experimental classes.

U. PLANS FOR THE FUTURE: To complete rewriting of manuals referred to in Sections M1 and M2. A program of geometry. Rewriting of book referred to in M5. A method of evaluation of results. An attempt will be made to extend the experiment to lower grades.

A. PROJECT TITLE: PROJECT FOR A MODERN TEACHING OF BIOLOGY IN SECONDARY SCHOOLS.

B. PROJECT DIRECTORS: Luigi L. Cavalli Sforza, Head, Genetics Department, University of Pavia; Marcello La Greca, Head, Zoological Department, University of Catania; Ruggero Tomaselli, Head, Botanical Department, University of Pavia; Enrico Dalmasso, Administrative Director, Office AIM, Ministry of Public Instruction, Rome; Sergio Beer, Central Inspector, Organizer, Ministry of Public Instruction, Rome.

C. PROJECT HEADQUARTERS:

1. Contact: Prof. Insp. Sergio Beer, Project for a Modern Teaching of Biology in Secondary Schools, Via Antonio Gallonio 18, 00161 Rome.
2. Address: For scientific purposes: Prof. Ruggero Tomaselli, Botanical Institute, University, Via S. Epifanio 14 - 27100 Pavia. For administrative purposes: Dr. Enrico Dalmasso, Ministry of Public Instruction, Classical Department, 00100 Rome.
3. Special facilities or activities available for visitor viewing: Visits to schools and laboratories where the project is in progress.

D. PRINCIPAL PROFESSIONAL STAFF: Luigi L. Cavalli Sforza; M. La Greca; R. Tomaselli; and their assistant: Renzo Scossiroli, Head, Genetics Department, University of Bologna.

E. PROJECT SUPPORT:

1. Organizational sponsorships: Italian Ministry of Public Instruction, Classical High Schools Department (Licei).
2. Funding agency: None.

F. PROJECT HISTORY:

1. Principal originators: Biologists of the CNES (National Committee for Scientific Education - Comitato Nazionale per l'Educazione Scientifica).
2. Date and place of initiation: April 1965 starting organization (European Centre of Education, Villa Falconieri, Frascati).
3. Reason for initiation: Modernization of biological teaching at the high-school level.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PURPOSES AND OBJECTIVES: To establish a number of pilot classes for the teaching of biology according to modern didactic criteria; to modernize the teaching of biology in secondary schools and to emphasize the experimental approach.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study; laboratory investigations; lectures; seminars; discussion groups.

J. ORIENTATIONS OF STATED OBJECTIVES: Content mastery; process acquisition; attitudinal changes; scientific literacy; career guidance; to supply with methods and problems of modern biology.

K. LOCATION OF LIST OF OBJECTIVES: In the typewritten drafts. (See also some pedagogical magazines).

L. SPECIFIC SUBJECTS, GRADE AND AGE LEVELS: Ecology, physiology, genetics, biochemistry, evolution and other fundamental chapters of biology for classical high schools, at 15-19 age level.

M. DESCRIPTION OF MATERIALS ALREADY PRODUCED:
1. Typewritten draft for theoretical lessons and for practical exercises.
2. Translation into Italian of "BSCS" (Biological Science Curriculum Study) yellow version, modified to suit Italian schools (Feltrinelli Publisher, Milan, 1967). The translation was organized by the Biological Commission of the Italian Ministry of Public Instruction (Prof. Adriano Buzzati-Traverso, Chairman).

N. MATERIALS AVAILABLE FREE: None.

O. MATERIALS PURCHASABLE: The books indicated in Section M2 at a nominal cost.

P. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: Italian.

Q. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: None.

R. PROJECT IMPLEMENTATION: The year 1967-1968 is the first year of the project implementation in the schools.
1. Number of teachers using materials: 22 teachers are using complete program; 40 others are using some materials.
2. Number of students involved: About 650.
3. Number of schools involved: 22 schools regularly; 40 partly.
4. Sources of totals in 1, 2, and 3 above: Teachers already fully trained and authorized to use the project in their schools are 22; 40 others are as partly trained. In the first year each teacher follows the project in one class only, each class including about 30 pupils.
5. Name and location of specific schools where course is being taught: The following is a partial listing: Acireale, Istituto Magistrale; Busto Arsizio, Liceo Scientifico; Giarre, Liceo Classico; Livorno, Liceo Scientifico; Milano, Liceo Scientifico "Volta"; Roma, Liceo Classico "Tasso".
6. Availability of consultants for teachers: Available, they visit the schools and give help to teachers.
7. Activities conducted for in-service teacher training: Twice a year there is a gathering of teachers at the Central Laboratory of Foligno, where a staff of experts shows new experiments under the supervision of the directors.
8. Implementation procedures in addition to above: None at present; more procedures will be developed in the near future.

S. PROJECT EVALUATION: Too soon to give an answer. National tests are administered which will be classified by the staff of professors.

T. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: (Not previously reported).

U. PLANS FOR THE FUTURE: To assure a new syllabus for Italian

secondary schools, there is a timetable for project development in five years. This will be extended to all classes in each school. Moreover, there is a program to extend the project to other schools in relation to the planned reform of the high school curriculum.

A. PROJECT TITLE: THE CONFERENCE OF SCIENCE EDUCATION STUDY IN OSAKA, JAPAN (CSES).

B. PROJECT DIRECTOR: Prof. Toshizo Isemura, Institute for Protein Research, Osaka University, Osaka, Japan.

C. PROJECT HEADQUARTERS:

1. Contact: Dr. Kozo Imahori, Prof. Biology, CSES, College of General Education, Osaka University, Toyonaka-shi, Osaka, Japan.
2. Headquarters address: The Conference of Science Education Study, Keirinkan Publishing Company, Daido 4, Tennoji-ku, Osaka, Japan.
3. Special facilities or activities available for visitor viewing: Visitors are invited to meetings held irregularly, and will be requested to present seminars. Available pamphlets and leaflets issued from the conference will be presented.

D. PRINCIPAL PROFESSIONAL STAFF: Toshizo Isemura, Prof. Chemistry, Osaka Univ.; Kozo Imahori, Prof. Biology, Osaka Univ.; Nobuo Ikebe, Prof. Geology, Osaka City Univ.; Satoru Muto, Assoc. Prof. Chemistry, Yokohama National Univ.; Shigenobu Tachimori, Assoc. Prof. Physics, Kanazawa Univ.; Ryozo Nishida, Secretary of CSES, Keirinkan Publishing Company.

E. PROJECT SUPPORT: Keirinkan Publishing Company.

F. PROJECT HISTORY:

1. Principal originators: Kozo Imahori and Nobuo Ikebe.
2. Date and place of initiation: November 1964; Osaka, Japan.
3. Reason for initiation: School science in Japan is controlled now by 'Curricula syllabus' which was issued by Japanese Government in 1958. A revised syllabus is expected to appear in 1968. The staff's aim is to advise on an ideal curriculum to the Ministry of Education.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PURPOSES AND OBJECTIVES: The main purpose is to improve and modernize education in both elementary and secondary school science. The unique characteristic of the project is to make a curriculum for grades 1-12. Descriptive contents are almost ignored but science of inquiry is emphasized.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Programmed instruction, laboratory investigations, discussion groups.

J. ORIENTATIONS OF STATED OBJECTIVES: Process acquisition, scientific literacy.

K. LOCATION OF LIST OF OBJECTIVES: In the forthcoming book, 'Improvement of School Science Education'.

L. SPECIFIC SUBJECTS, GRADE AND AGE LEVELS: Science I-IX, grades 1-9; Biology, grade 10; Geology, grade 10; Chemistry, grades 11&12; Physics, grades 11&12.

M. DESCRIPTION OF MATERIALS ALREADY PRODUCED:
Kenri: 1. Study on BSCS; 2. Study on PSSC; 3. Study on CHEMS; 4. Study on ESCP.
SYO: 14. Study on ESS; 15. Growing seeds; 16. Kitchen physics; 17. Small things; 18. Behavior of mealworms; 19. Gases and airs; 20. Translation of 'Growing seeds.' Many mimeographed reports are also published, including 'Catalogue of publications' by CSES.

N. MATERIALS AVAILABLE FREE: SYO series are available. (See M).

O. MATERIALS PURCHASABLE: Kenri series are purchasable. (See M). ¥ 80 each.

P. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: Japanese.

Q. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: None.

R. PROJECT IMPLEMENTATION:
1. Number of teachers using materials: Just now only a few experimental editions are used by several teachers around Kansai District.
2. Number of students involved: Around 1,000.
3. Number of schools involved: (Not answered).
4. Sources of totals in 1, 2, and 3 above: (Not answered).
5. Name and location of specific schools where course is being taught: Elementary school of Kobe.
6. Availability of consultants for teachers: Members of the conference, especially the committee for elementary school science.
7. Activities conducted for in-service teacher training: None.

S. PROJECT EVALUATION: Evaluation systems are not well developed.

T. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: Book titled Philosophy on Improvement of Science Education has been edited and is now in press. Writing team for textbooks has just been established and will start writing soon.

U. PLANS FOR THE FUTURE: Writing conference for primary school science, grades 1-6; test edition will appear around the end of 1968. Writing conference for secondary school science, grades 7-9; test edition will appear around the middle of 1969.

A. PROJECT TITLE: SCIENCE TEACHING ENRICHMENT PROGRAMME (STEP).

B. PROJECT DIRECTOR: Secondary Education Division, Ministry of Education, His Majesty's Government, Singh Durbar, Kathmandu, Nepal.

C. PROJECT HEADQUARTERS:
1. Address: Science Teaching Enrichment Programme, Babarmahal, Kathmandu, Nepal (after February 1968: Harihar Bhawan, Phul Chowk, Patan, Nepal).
2. Contact: Richard H. Pfau.
3. Special facilities or activities available for visitor viewing: Classes and facilities in 11 STEP schools throughout Nepal (4 in Kathmandu valley most convenient); STEP office.

D. PRINCIPAL PROFESSIONAL STAFF: Nir Mardan Basnyat, Deputy Director, Secondary Education Division; Bhairab Prasad Upadhya, Science Specialist; Richard Pfau (Peace Corps Volunteer), Coordinator; William Stinson (PCV), teacher's manual editor; John Oehler (PCV), office staff; John Wenderoth (PCV), office staff.

E. PROJECT SUPPORT:
1. Organizational sponsorships: Ministry of Education; Peace Corps.
2. Funding agencies: His Majesty's Government of Nepal; U.S. Agency for International Development; UNESCO/UNICEF.

F. PROJECT HISTORY:
1. Principal originators: Bhairab Prasad Upadhya, Science Specialist; W. Christopher Jeffers (PCV).
2. Date and place of initiation: April 1966 (unofficially); December 1966 (officially); Kathmandu, Nepal.
3. Reason for initiation: STEP was begun as an effort by the Ministry of Education to create a comprehensive and effective program for supplanting the rote learning approach of science education in Nepal's secondary schools.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PURPOSES AND SPECIFIC OBJECTIVES: STEP aims to produce a science course geared to the abilities of Nepal's teachers and students, emphasizing a discovery approach to science, and development of creative thinking. To insure the accomplishment of these goals, STEP has produced a series of lessons and attempts to make their implementation inevitable. When a school is chosen for STEP, a science teacher from the school receives training in the use of the STEP teacher's manual, a series of detailed daily lesson plans including pedagogical and technical background notes. His school is supplied with all equipment needed to teach the manual (stressing use of locally available materials) and suitable furniture for a classroom/laboratory (large blackboards, flat-topped desks, storage facilities, etc.). Arrangements are made for classroom renovation or construction, if necessary. Enrollment is limited to 40 students per class section.

The teacher's work load is limited to 24 teaching periods per week. Each STEP science class section meets 6 times per week. And a Peace Corps Volunteer is assigned to the school to work closely with the STEP-trained teacher.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: No formal lecture or laboratory sessions, the activities are interwoven.

J. ORIENTATIONS OF STATED OBJECTIVES: Content mastery; process acquisition; attitudinal changes.

K. LOCATION OF LIST OF OBJECTIVES: Can be found in an article entitled STEP: A Bold New Approach to High School Science that appeared in the "Ministry of Education Journal," September 1967.

L. SPECIFIC SUBJECTS, GRADE AND AGE LEVELS: Classes VI and VII (6th and 7th grades) now; eventually classes VI-X. Ages 10-16.

M. DESCRIPTION OF MATERIALS ALREADY PRODUCED:
1. STEP Class VI Teacher's Manual, experimental edition. Units on magnetism, matter, heat, water, air, ecology, disease, and the senses are included in this manual.
2. Supplementary visual aids, reading matter, and tests for all units.

N. MATERIALS AVAILABLE FREE: Teacher's manual units (item 1) available directly from STEP, supply permitting.

O. MATERIALS PURCHASABLE: None.

P. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

Q. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: Nepali.

R. PROJECT IMPLEMENTATION:
1. Number of teachers using materials: 16 Nepali teachers.
2. Number of students involved: Approximately 1,000.
3. Number of schools involved: 11.
4. Sources of totals in 1, 2, and 3 above: Project count.
5. Name and location of specific schools where course is being taught: College of Education Laboratory School; Durbar High School; Patan High School; Padma Kanya High School in the Kathmandu valley; Tri Joodha Multi-purpose High School in Birgunj.
6. Availability of consultants for teachers: Staff visits to schools.
7. Activities conducted for in-service teacher training: Winter training programs, yearly, lasting two months each; training includes practice teaching, discussion periods, technical lectures and lab activities covering materials in STEP manuals, in-depth studies.
8. Implementation procedures in addition to above: An American Peace Corps Volunteer works with each teacher trained by STEP during the school session.
9. Implementation procedure, seemingly, the most effective:

All are necessary.
10. How evaluated: No formal evaluation.

S. PROJECT EVALUATION:
1. Evaluation conducted by: Staff members.
2. Instruments used: Daily lesson evaluation forms submitted by teacher teams, classroom test results, staff visitation.
3. Control groups: None used yet.
4. Feedback process: Participating teachers and PCVs submit daily evaluation forms. Standard tests are given at the end of each unit; these tests are sent to the STEP office for analysis.
5. Research evidence of objectives achieved: None as yet.
6. Other pertinent information: Obvious differences between STEP and non-STEP students in classroom participation. Students in STEP classes are being encouraged to do and are doing critical, original thinking and are learning to take an active role in the learning process. Change in teachers role from an all-knowing authority to a guide is also evident.

T. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: (Not previously reported).

U. PLANS FOR THE FUTURE: Annual summer workshops for preparation and revision of teacher's manuals, through class X; annual winter teacher training programs; annual expansion at the rate of about 10 new schools per year; annual phasing-in of STEP for classes VI-X in each STEP school. Formal evaluation planned during 1968.

A. PROJECT TITLE: A PROGRAMMED FIRST COURSE IN ALGEBRA (HYBRID FORM).

B. PROJECT DIRECTOR: Dr. Lucas N.H. Bunt, A Programmed First Course in Algebra (Hybrid Form), Institute for the Training of Secondary School Teachers, University of Utrecht, Lucas Bolwerk 11, Utrecht, Netherlands.

C. PROJECT HEADQUARTERS:
1. Contact: Project Director, A Programmed First Course in Algebra (Hybrid Form).
2. Special facilities or activities available for visitor viewin; (Not answered).

D. PRINCIPAL PROFESSIONAL STAFF: (Not answered).

E. PROJECT SUPPORT: Netherlands Organization for the Advancement of Pure Research.

F. PROJECT HISTORY:
1. Principal originator: (Not answered).
2. Date and place of initiation: September 1967; Utrecht.
3. Reason for initiation: Improvement of mathematics teaching.

G. PRESENT COMMERCIAL AFFILIATIONS: Wolters-Noordhoff Publishing Company, Groningen, Netherlands.

H. PURPOSES AND OBJECTIVES: (Not answered).

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Programmed instruction

J. ORIENTATIONS OF STATED OBJECTIVES: Content mastery; attitudinal changes; mathematical insight.

K. LOCATION OF LIST OF OBJECTIVES: (Not answered).

L. SPECIFIC SUBJECTS, GRADE AND AGE LEVELS: Mathematics, grades 7-9, age level 12-15 years.

M. DESCRIPTION OF MATERIALS ALREADY PRODUCED:
1. Algebra voor de Brugklas, A, B, C. (Includes material prepared by the School Mathematics Study Group).

N. MATERIALS AVAILABLE FREE: None.

O. MATERIALS PURCHASABLE: Item 1.

P. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: Dutch.

Q. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: (Not answered).

R. PROJECT IMPLEMENTATION:
1. Number of teachers using materials: 20.
2. Number of students involved: 500.
3. Number of schools involved: 7.
4. Sources of totals in 1, 2, and 3 above: By counting.
5. Name and location of specific schools where course is being taught: Utrecht.
6. Availability of consultants for teachers: Available; at the institute mentioned in R5.

7. Activities conducted for in-service teacher training: Seminars.
8. Implementation procedures in addition to above: (Not answered).

S. PROJECT EVALUATION:
1. Evaluation conducted by: (Not answered).
2. Instruments used: (Not answered).
3. Control groups: (Not answered).
4. Feedback process: (Not answered).
5. Research evidence of objectives achieved: Very good results of the students as compared with traditional methods of teaching.
6. Availability of evidence: (Not answered).

T. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: (Not previously reported).

U. PLANS FOR THE FUTURE: Continuation of present project.

A. PROJECT TITLE: THE HARVARD/NIGERIAN PROJECT, COMPREHENSIVE HIGH SCHOOL, AIYETORO.

B. PROJECT DIRECTOR: Mr. Rodney Hinkle, Co-ordinator, Nigerian Project, Harvard University, 38 Kirkland St., Cambridge, Mass. 02138.

C. PROJECT HEADQUARTERS:
1. Contact: Mr. Rodney Hinkle, Co-ordinator, The Harvard/ Nigerian Project.
2. Special facilities or activities available for visitor viewing: Some boarding facilities are available; tours can be conducted.

D. PRINCIPAL PROFESSIONAL STAFF: Rodney Hinkle, Project Co-ordinator; Elba Carrier, Associate Coordinator; Edward Kaelber, Chief of Party; Melville P. Cote, Guidance Advisor; John Reynolds, Technical Education Advisor; Merrill Merritt, Chemistry Advisor.

E. PROJECT SUPPORT:
1. Organizational sponsorships: Center for Studies in Education and Development, Harvard University; Harvard University Graduate School of Education; US/AID; The Western State of Nigeria Ministry of Education.
2. Funding agencies: Harvard University, US/AID, Ford Foundation.

F. PROJECT HISTORY:
1. Principal originators: US/AID, Harvard Graduate School of Education (Under Frank Keppel).
2. Date and place of initiation: 1962; Western Region, Nigeria.
3. Reason for initiation: To assist a developing country.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PURPOSES AND OBJECTIVES: The purpose of the contract was to build, organize and develop a comprehensive high school, modeled after American and European Schools, that would take into account the culture and needs of Western Nigeria. Harvard was to provide the support in the form of instructors, and curriculum developers to modify and create appropriate materials for Nigerian children. The school was unique in that after the initiation of the project, the complete administration of the school was given over to the Nigerian staff. Some Nigerians were sent to the United States for further training. The School is now in its sixth year, offers courses in the West African School Certificate, both ordinary and advanced levels, technical versatility course, radio repair, commercial subjects, and home economics.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Laboratory investigations; lectures; seminars; have tried PSSC, BSSC and CHEM Study. These are still being adapted.

J. ORIENTATIONS OF STATED OBJECTIVES: Content mastery; process

acquisition; attitudinal changes; scientific literacy.

K. LOCATION OF LIST OF OBJECTIVES: The contract, and Annual Reports of the Center of Study in Education and Development, Harvard University Graduate School of Education.

L. SPECIFIC SUBJECTS, GRADE AND AGE LEVELS: All subjects, Forms I through Upper Six.

M. DESCRIPTION OF MATERIALS ALREADY PRODUCED: Only a three year course in general science is ready for publication. The other science programs which began with PSSC, BSSC, and CHEM Study seem to be swinging toward the Nuffield approach and materials. This is controlled by the Government. No longer participate in these areas, but did begin them.

N. MATERIALS AVAILABLE FREE: Limited - Ford Foundation, 47 Marina, Lagos, Nigeria; Curriculum Co-ordinator, Comprehensive High School, P.O. Box 89, Abeokuta, W.S. Nigeria.

O. MATERIALS PURCHASABLE: None.

P. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

Q. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: None.

R. PROJECT IMPLEMENTATION:
1. Number of teachers using materials: Over 10.
2. Number of students involved: Over 1,000 have been exposed to it.
3. Number of schools involved: Varies in programs, about 10 in general science.
4. Sources of totals in 1, 2, and 3 above: The number of people in the school. It is a low estimate as it cannot yet be ascertained the number of other schools really using it.
5. Name and location of specific schools where course is being taught: Comprehensive High School, Aiyetoro, Western State, Nigeria. Other schools in Western Nigeria have been trying out the materials, but as yet have not adopted them, as far as is known.
6. Availability of consultants for teachers: Faculty members of the Comprehensive School, Aiyetoro are available. Workshops have been held in math, gen. science and administration.
7. Activities conducted for in-service teacher training: Workshops lasting 10 days to teach use of the general science materials.
8. Implementation procedures in addition to above: Many working committees, including social studies, and physics, and chem. are being conducted and are writing new curricula.
9. Implementation procedure, seemingly, the most effective: Difficult to assess so far.
10. How evaluated: This is underway, but personal reports on progress are written quarterly. Since attitudes and actions are the prime hope of this project, scientific evaluative

devices have not yet been employed.

S. PROJECT EVALUATION:

1. Evaluation conducted by: US/AID.
2. Instruments used: Quarterly Reports.
3. Control groups: (Not answered).
4. Feedback process: (Not answered).
5. Research evidence of objectives achieved: None.
6. Availability of evidence: Direct contact with the Nigerian Project, Harvard Graduate School of Education or US/AID, Lagos.

T. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: (Not previously reported).

U. PLANS FOR THE FUTURE: Phase out 1969.

A. PROJECT TITLE: DEPARTMENT OF EDUCATION, TERRITORY OF PAPUA AND NEW GUINEA, SECONDARY SCIENCE COURSE FORMS 1-4.

B. PROJECT DIRECTOR: M.N. Maddock, Inspector of Schools, Education Dept. H.Q., Secondary Division, Konedobu, Papua, New Guinea. Tel. Port Moresby 4291.

C. PROJECT HEADQUARTERS:
1. Contact: The Director of Education, Secondary Science Course Forms 1-4.
2. Special facilities or activities available for visitor viewing: None.

D. PRINCIPAL PROFESSIONAL STAFF: D.A. Mitchell, R. Hynes, R. Stanton, G. Griffiths, M. Mortimer, K. Marshall, P. Plummer, Bro. Lucian, B.A. Jeans.

E. PROJECT SUPPORT:
1. Organizational sponsorships: UNDP/UNESCO is providing science staff at Goroka Teachers College and a consultant in 1968, who will participate.
2. Funding agency: UNICEF (for equipment).

F. PROJECT HISTORY:
1. Principal originator: M.N. Maddock.
2. Date and place of initiation: 1965; Papua, New Guinea.
3. Reason for initiation: Imported courses unsuitable for territory situation, need for a new approach.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PURPOSES AND OBJECTIVES: To develop a general science course appropriate to the Papua-New Guinea situation, in which the pupils come from a cultural background which lacks experiences needed to develop modern science concepts, has different intellectual outlooks and attitudes to cause and effect, and have to be taught through the medium of English, which is a foreign language. To develop techniques for changing the traditional cultural attitude, and developing appropriate basic concepts, understanding, skills and attitudes appropriate to modern science. Previous syllabuses have been imported from elsewhere and have concentrated on bodies of prescribed content aimed at external examinations. The new syllabus is much more flexible and aims at providing experiences which will lead to concept development. Considerable choice is open to the teacher, depending on his own science background, the ability of the pupils and local environmental conditions. It has been structured in three areas: a basic core aimed at developing a minimum of basic concepts, together with skills and attitudes, that are considered basic and essential to a study of any science, a developmental area aimed at developing a detailed appreciation and understanding of one technological and one bio-geological theme of direct impact on the pupil in his local environment, and a research area designed to give first hand experience in how the concepts, skills and attitudes

can be directly applied to solving a problem. The external examination is being reduced to a brief test of understanding on the concepts in the basic core, rather than on context material, and progressive evaluation of pupils work within the school will receive major emphasis.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study, laboratory investigations, discussion groups, library research.

J. ORIENTATIONS OF STATED OBJECTIVES: Process acquisition, attitudinal changes, scientific literacy, acquisition of manipulative skills.

K. LOCATION OF LIST OF OBJECTIVES: The preamble.

L. SPECIFIC SUBJECTS, GRADE AND AGE LEVELS: General Science embracing physics, chemistry, biology, geology; Forms I-IV, Territory 'T' High Schools.

M. DESCRIPTION OF MATERIALS ALREADY PRODUCED:
1. Draft Syllabus Form I-II published and introduced to Form I, 1966.
2. Draft Syllabus Forms III-IV produced 1967, and suggested activities.

N. MATERIALS AVAILABLE FREE: Item 1, limited copies; Item 2, limited copies of duplicated draft; from The Director of Education, Education Department, H.Q., Konedobu.

O. MATERIALS PURCHASABLE: None.

P. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

Q. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: None.

R. PROJECT IMPLEMENTATION:
1. Number of teachers using materials: 86.
2. Number of students involved: 11,000.
3. Number of schools involved: 57.
4. Sources of totals in 1, 2, and 3 above: From Departmental returns.
5. Name and location of specific schools where course is being taught: The following names have been selected at random from the list of 57, no particular significance attached: Kila Kila High School, Port Moresby; Goroka High School, Coroka; Kwikila High School, Central District; Cameron High School, Milne Bay District; De La Salle High School, Bomana Central District; Chanel College, New Britain.
6. Availability of consultants for teachers: The following are available: Syllabus Committee representatives by correspondence; project director by correspondence and visits to schools; in-service seminars.
7. Activities conducted for in-service teacher training: Regional seminars to be conducted at 1968 District teachers meetings.
8. Implementation procedures in addition to above: Pre-service

courses on new syllabus to be started for secondary science teachers at Goroka Teachers College 1968.
9. Implementation procedure, seemingly, the most effective: Project not advanced enough yet to decide.

S. PROJECT EVALUATION:
1. Evaluation conducted by: The syllabus committee.
2. Instruments used: teachers meetings; feedback reports; testing; field observation by departmental inspectors; research grants.
3. Control groups: None used.
4. Feedback process: Regular reports to syllabus committee from teachers using course.
5. Research evidence of objectives achieved: None available yet, first research grant given 1966.

T. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: Syllabus committee worked during 1967 to establish the framework and suggested activities for 3rd and 4th year units, to be put into operation 1968.

U. PLANS FOR THE FUTURE:
1. Continue production of suggested activities for 3rd and 4th year, establish feedback procedures, 2 in-service seminars, complete phase-out of old syllabus, develop test materials.
2. Institute Primary Science project to develop continuity Primary-Secondary.
3. Provision of additional equipment by UNICEF.

A. PROJECT TITLE: INSTITUTO PARA LA PROMOCION DE LA ENSENANZA DE LA BIOLOGIA, (INSTITUTE FOR THE ADVANCEMENT OF BIOLOGY TEACHING)*.

B. PRINCIPAL ORIGINATORS AND DATE OF PROJECT INITIATION: Eleven biologists of Peru. They work in 4 universities and in secondary schools. September 1963.

C. PROJECT DIRECTOR: Raul Ishiyama, Universidad Peruana Cayetano Heredia. Apartado 5045, Lima, Peru.

D. EXECUTIVE SECRETARY: Cesar A. Quiroz. Instituto Pedagogico Nacional. Av. Mexico 2087, La Victoria, Lima, Peru.

E. PROJECT HEADQUARTERS ADDRESS: Universidad Peruana Cayetano Heredia. Apartado 5045, Lima, Peru.

F. PROFESSIONAL STAFF: Manuel Vegas, Professor of Fisheries, Universidad Agraria; Raul Ishiyama, Professor of General Biology, Universidad Cayetano Heredia; Lydia Gonzalez, Prof. of Biology, Teachers School of La Cantuta; Estela de Maruenda, Aux. Prof. of Zoology, Universidad de San Marcos; Alberto Cazorla, Prof. of Biochemistry, Universidad Cayetano Heredia; Ramiro Castro, Prof. of Pharmacology, Universidad Cayetano Heredia; Cesar Moran, Prof. of Cytology, Universidad Agraria; Julia de Hidalgo, National Hygiene Institute; Santiago Ramos, Guadalupe School, Lima; Hernando Macedo, Checayani Laboratory, Puno; Augusto Vejarano, Aux. Prof. of Plant Physiology, Universidad Agraria; Cesar A. Quiroz, Chairman of Biology Department, Instituto Pedagogico Nacional; Victor Ishiyama, Aux. Professor of General Biology, Universidad Cayetano Heredia; Afranio Livia, Aux. Professor of General Biology, Universidad Cayetano Heredia; Magdalena P. de Sueldo, Aux. Professor of General Biology, Universidad Cayetano Heredia; Luis Gonzales Mugaburu, Professor of Parasitology, Universidad de San Marcos; Ulises Moreno, Chairman of Biology Department, Universidad Agraria.

G. PROJECT SUPPORT:

1. Organizational sponsorships: Universidad Cayetano Heredia, Universidad Agraria and Ministry of Education.
2. Funding agencies: None at present.

H. SPECIFIC PURPOSES AND OBJECTIVES: To modernize the biology knowledge of teachers and to promote the best teaching of biology, with modern materials, simple laboratory equipment, and intensive participation of students.

I. SPECIFIC SUBJECTS AND GRADE LEVEL: College level, for teachers of biology in the secondary schools. In 1964 and 1965 summer courses: selected topics in cytology, biochemical cytology, animal physiology, ecology, evolution and genetics, with some 30 laboratory experiences. In 1966 summer course: Green Version of the BSCS. In 1967 summer course: Green, Blue and Yellow Versions of the BSCS. Not complete but assorted topics of each one.

J. MATERIALS ALREADY PRODUCED AND DESCRIPTION:
   1. 30 Guides for Laboratory Experiments.
   2. 1 Kit for Laboratory Experiments.

K. USE PROJECT MATERIALS: 106 teachers are using the complete program.

L. LANGUAGE: Spanish.

M. LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: (Not answered).

N. ADDITIONAL MATERIALS PRESENTLY BEING DEVELOPED: Biology textbooks for normal schools.

O. MATERIAL PURCHASABLE: Those described in N and kits for secondary schools laboratories.

P. MATERIALS AVAILABLE FREE: IPEB - Boletin Informativo. Nos. 1 and 2.

Q. SPECIFIC PLANS FOR EVALUATION OF MATERIALS: Written information from teachers about the usefulness of the materials and suggestions to improve them, and personal visits to teachers, observations of the work, and discussion about success and difficulties.

R. SPECIFIC PLANS FOR TEACHER PREPARATION: Besides summer institutes for secondary school teachers of biology, regional seminars for discussing biology teaching improvement (intended for normal school teachers mainly) and regional winter institutes for elementary school teachers.

S. PROJECT ACTIVITIES SINCE 1967 REPORT: Fourth summer institute for secondary school teachers of biology held in February 1967. The IPEB participated in the Second Symposium for Teaching Biology in Secondary Schools submitting several projects for discussion and in the First Seminar for Plans and Programs of Biology Teaching in Secondary Schools.

T. PLANS FOR THE FUTURE:
   1. New summer institutes.
   2. Seminars about modern biology teaching, in various cities of the country.
   3. Translations of some paperbacks to use for complementary lectures.
   4. Publication of own works in special subjects.

*Response made on questionnaire format for the 1966 Report.

A. PROJECT TITLE: ELEMENTARY SCIENCE CURRICULUM DEVELOPMENT (ESCD).

B. PROJECT DIRECTOR: Mr. Aurelio Juele, Science Education Section, Bureau of Public Schools, Manila, Philippines. Tel. 3-34-88.

C. PROJECT HEADQUARTERS:
1. Contact: The Director, ESCD, Bureau of Public Schools.
2. Special facilities or activities available for visitor viewing: None.

D. PRINCIPAL PROFESSIONAL STAFF: Mr. Aurelio Juele, Supervising Educational Specialist I; Mr. Efrain Abracia, Curriculum Coordinator I; Mr. Guillermo Cabanilla, General Education Supervisor II; Miss Carolina V. Perez, Curriculum Coordinator II.

E. PROJECT SUPPORT:
1. Organizational sponsorships: Bureau of Public Schools; Peace Corps/Philippines.
2. Funding agency: Bureau of Public Schools.

F. PROJECT HISTORY:
1. Principal originator: Science Education Section.
2. Date and place of initiation: January 16, 1966; General Office, Bureau of Public Schools.
3. Reason for initiation: To develop adequate and up-to-date instructional materials in elementary science.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PURPOSES AND OBJECTIVES: To clarify and define the emphases and content of elementary science in the various grade levels. The materials developed by this project emphasize science as a process whereby the child learns to understand his environment and simultaneously develops scientific skills through personal experiences with materials and phenomena. The skills emphasized in each grade level vary. For Grade III they are observation, interpretation, comparison and classification. In Grade IV the skills developed in the previous grade are utilized and the skill of measurement is developed. The skills emphasized in Grades III and IV, are strengthened in Grade V, while inference, hypothesis and communication are developed and stressed. In Grade VI, all the skills developed in the early grades are developed further and the skills of predicting, controlling variables and experimenting are developed and stressed as a means of learning about science. The science content that the child learns is organized around basic concepts which serve as unifying threads in a more realistic science instruction program. The content is organized around three broad topics, namely: living things; matter, energy and motion; Earth and space. The activities under these topics are those that contribute to the development of the aforementioned scientific skills.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Laboratory investigations.

J. ORIENTATIONS OF STATED OBJECTIVES: Process acquisition;

attitudinal changes.

K. LOCATION OF LIST OF OBJECTIVES: The unit objectives are found in the beginning of each unit, while topic objectives precede the series of lessons presented.

L. SPECIFIC SUBJECTS, GRADE AND AGE LEVELS: Grade III, 9 years of age; grade IV, 10 years of age; grade V, 11 years of age; grade VI, 12 years of age.

M. DESCRIPTION OF MATERIALS ALREADY PRODUCED:
1. A Curriculum Guide in Elementary Science III.
2. A Curriculum Guide in Elementary Science IV.
3. A Curriculum Guide in Elementary Science V.
4. A Curriculum Guide in Elementary Science VI.

N. MATERIALS AVAILABLE FREE: Items 3 and 4.

O. MATERIALS PURCHASABLE: None.

P. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

Q. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: None.

R. PROJECT IMPLEMENTATION:
1. Number of teachers using materials: Approximately 6,000 teachers.
2. Number of students involved: Approximately 30,000 students.
3. Number of schools involved: Approximately 1,500 schools.
4. Sources of totals in 1, 2, and 3 above: Feedback information and distribution list.
5. Name and location of specific schools where course is being taught: Several schools scattered throughout the country.
6. Availability of consultants for teachers: Available. Division science supervisors conduct seminars to assist the teachers on the use of the guides. In addition to these science supervisors make follow-up observation visits of classes in which the new materials are being tried.
7. Activities conducted for in-service teacher training: Summer Institutes on: (1) teaching science as a process, (2) orientation on the use of the new curriculum materials.
8. Implementation procedures in addition to above: Individual teachers co-teach with a Peace Corps volunteer who has had some training in teaching science as a process.
9. Implementation procedure, seemingly, the most effective: All are found to be effective.
10. How evaluated: Based on teacher's remarks in their feedback reports.

S. PROJECT EVALUATION: (Not answered).

T. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: (Not answered).

U. PLANS FOR THE FUTURE: (Not answered).

A. PROJECT TITLE: NOTRE DAME EDUCATIONAL ASSOCIATION SCIENCE AND MATHEMATICS PROGRAM (NDEA SCIENCE AND MATHEMATICS TEACHING AND TESTING).

B. PROJECT DIRECTOR: Dr. Federico C. Aquino, Executive Director, Notre Dame Educational Association, Sinsuat Avenue, Cotabato City, Philippines 90301.

C. PROJECT HEADQUARTERS:

1. Contact: Project Director, NDEA Science and Mathematics Teaching and Testing.
2. Special facilities or activities available for visitor viewing: There are no special facilities yet provided, and the only project-related activities are the six week summer institutes and the year-round seminars conducted in science and mathematics. Various syllabi in mathematics and science are on file in the NDEA office.

D. PRINCIPAL PROFESSIONAL STAFF: J. Damian Teston, FMS, Dean, Notre Dame of Marbel College, Cotabato; Robert F. Lafleur, FMS, Chairman, Mathematics Department; Belen de Jesus, Chairman, Teacher Education, and Tomas E. Hennessey, FMS, Chairman, Science Department, Notre Dame of Marbel College, Cotabato; Robert E. Sullivan, OMI, Dean, Notre Dame of Tacurong College, Cotabato; Felix E. Gilligan, FMS, Supervisor, Marist Schools and Colleges, Far East, Marists, Tamontaka, Cotabato City.

E. PROJECT SUPPORT:

1. Organizational sponsorships: The Notre Dame Educational Association; Notre Dame of Marbel College, Koronadal, Cotabato.
2. Funding agencies: The Ford Foundation; The Asia Foundation; The National Science Board (NSDB) (Republic of the Philippines) Development.

F. PROJECT HISTORY:

1. Principal originators: Dr. Federico C. Aquino, Robert E. Sullivan, OMI, Felix E. Gilligan, FMS.
2. Date and place of initiation: April 1963; Notre Dame of Cotabato Colleges, Cotabato City.
3. Reason for initiation: Basically, to raise student achievement levels through making available to member schools of the Association various course outlines, syllabi and other teaching materials, realistic course objectives and efficient evaluative tools.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PURPOSES AND OBJECTIVES: The initial purpose still pertains to raising achievement levels. This project is differentiated from similar projects in that it is founded on the students' pre-secondary background and not upon assumed or imposed secondary level objectives. Previous course outlines or syllabi are revised and refined based on test results and findings of research conducted during the year; the year round series of seminars for teachers have been initiated to help the

teachers in the use of the syllabi; to update their knowledge on the subject matter and ultimately improve the overall quality of their teaching (process and content - methodology and subject matter).

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Laboratory investigations; lectures; seminars; discussion groups.

J. ORIENTATIONS OF STATED OBJECTIVES: Content mastery; process acquisition; attitudinal changes.

K. LOCATION OF LIST OF OBJECTIVES: These are found in a specific section of the various syllabi, after the introduction. Both general objectives and specific objectives are stated, the general objectives precede the specific objectives.

L. SPECIFIC SUBJECTS, GRADE AND AGE LEVELS: Seventh year of school: review arithmetic, general science; eighth year of school: elementary algebra, general science; ninth year of school: intermediate algebra, biology; tenth year of school: geometry, physics and chemistry.

M. DESCRIPTION OF MATERIALS ALREADY PRODUCED:
1. A Tentative Syllabus for General Science I and A Manual of Experiments, 1967.
2. A Tentative Syllabus for First Year Course Algebra, 1965.
3. A Tentative Syllabus for Advanced Algebra (Intermediate), 1966.
4. First Revision of Mathematics I Syllabus and Achievement Tests, 1967.
5. A Statistical Analysis of Year-End Tests, 1964, 1965, 1966, 1967.
6. Year-End Examinations for No. 1, 1967-68.
7. Year-End Examinations for No. 2, 1965-68.
8. Year-End Examinations for No. 3, 1966-68.

N. MATERIALS AVAILABLE FREE: Items 1-8 are available in a very limited supply from NDEA, Sinsuat Avenue, Cotabato City, Philippines.

O. MATERIALS PURCHASABLE: None.

P. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

Q. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: None.

R. PROJECT IMPLEMENTATION:
1. Number of teachers using materials: Approximately 1,000.
2. Number of students involved: 24,500 students.
3. Number of schools involved: All the Notre Dame High Schools of the provinces of Cotabato (Cotabato and Cotabato del Sur) and Sulu, members of the Notre Dame Educational Association (NDEA): 57 secondary schools.
4. Sources of totals in 1, 2, and 3 above: The yearly Census Report of NDEA contains a report of the total number of teachers by sex, by year and by school; it also contains the total number of students by school, by sex and by year.

5. Name and location of specific schools where course is being taught: See Section R3.
6. Availability of consultants for teachers: Available for teachers within the NDEA. Occasionally, speakers from the University of the Philippines Science Education Center (SEC) and the National Science Development Board (NSDB) are invited as speakers in various seminars and workshops.
7. Activities conducted for in-service teacher training: Regularly scheduled seminars and workshops are conducted in the teaching of science and mathematics. Follow-up seminars in the use of completed syllabi in the subject conducted by teachers who attended various summer institutes are conducted in various centers; summer institutes in teaching mathematics and science are held in ND Cotabato, ND Jolo, ND Marbel and ND Kidapawan Colleges.
8. Implementation procedures in addition to above: Content, group development of procedures best suited to the course objectives; group development of instructional materials required by course objectives and limited resources. Seminars and workshops and unit tests as well as the year-end examinations conducted in all subjects.
9. Implementation procedure, seemingly, the most effective: The regular seminars have been very helpful in making the teachers understand various procedures suggested. There has been a noticeable improvement in the quality of teaching. Unit tests have also been very effective; the year-end tests have served as a great motivating factor.
10. How evaluated: Critical checklists filed by teachers employing materials; teacher conferences; results of year-end examinations based on course outlines or syllabi.

S. PROJECT EVALUATION:

1. Evaluation conducted by: The NDEA Office, specifically the Executive Director is in charge of evaluation. The classroom teachers help in gathering various data needed for this evaluation.
2. Instruments used: Primary sources are the results of the Year-End Examinations; ancillary materials are checklists filed by teachers and results of interviews and conferences with teachers and school directors.
3. Control groups: None have been formally established, but informal groups are available for contrast and comparison.
4. Feedback process: Results of the year-end examinations as well as the various unit tests conducted provide primary data. These reveal areas which need revision and refinement. Thirty teachers in the teaching of mathematics and 30 teachers in science were trained in the summer of 1967.
5. Research evidence of objectives achieved: The statistical analyses which have been made of the results of the year-end examinations are conducted.
6. Availability of evidence: Available; limited copies of the various statistical analyses are available at the NDEA Office.

Communication should be addressed to the Executive Director, Notre Dame Educational Association, Cotabato, Philippines.
7. Other pertinent information: Complete description of NDEA activities for the year are included in the Annual Report, prepared by the Executive Director.

T. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: See Section S7.

U. PLANS FOR THE FUTURE: Summer 1968 (May 13-June 22, 1968):
1. Summer Institutes in the teaching of: mathematics 2, general science 2 and general science 1 to be held at the Notre Dame of Marbel College, Koronadal, Cotabato, Philippines.
2. Summer Institute in the teaching of biology, to be held at the Notre Dame of Kidapawan College, Kodapawan, Cotabato, Philippines.

A. PROJECT TITLE: PHYSICS EQUIPMENT PROJECT.

B. PROJECT DIRECTOR: Dr. Liceria B. Soriano, Assistant Director, Bureau of Public Schools, Manila, Philippines. Tel. 22-1170.

C. PROJECT HEADQUARTERS:
1. Contact: Project Director, Physics Equipment Project.
2. Special facilities or activities available for visitor viewing: Physics Equipment Center, University of the Philippines - design of prototypes; Marikina School of Arts and Trades - production of physics equipment.

D. PRINCIPAL PROFESSIONAL STAFF: Reginald Melton, Consultant; Segundo Roxas, Professor (in charge of curriculum development); Luis Alarilla, Professor (in charge of teacher training); Lamberto Jeresano, Supervisor of Equipment Production; Chiang Yang Yu, in charge of physics equipment design; Asterio Palima, in charge of physics equipment design.

E. PROJECT SUPPORT:
1. Organizational sponsorships: University of the Philippines; Department of Education; Bureau of Public Schools; Bureau of Vocational Education.
2. Funding agencies: National Science Development Board; Colombo Plan (Britain and New Zealand).

F. PROJECT HISTORY:
1. Principal originators: Liceria B. Soriano, Romulo Mendoza, Aurelio Juele, Reginald Melton, Dolores Hernandez, Mauro Gonzales, Luz Sangalang, Angela M. Villavert, Aurora Santos.
2. Date and place of initiation: August 1, 1966; Manila.
3. Reason for initiation: To improve the teaching of high school physics throughout the country.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PURPOSES AND OBJECTIVES:
1. To provide and improve coordination in teacher training, equipment production, curriculum development, and laboratory improvement through an integrated program of:
   a. Local production of inexpensive and educationally valid equipment.
   b. Development of technical blue prints and explanatory notes of physics equipment.
   c. Training of teachers and supervisors on the use and minimum repair of physics equipment.
2. To lower the price of physics equipment in schools through a pilot demonstrational project.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Laboratory investigations; discussion groups.

J. ORIENTATIONS OF STATED OBJECTIVES: Content mastery; process acquisition; attitudinal changes.

K. LOCATION OF LIST OF OBJECTIVES: In the Project Proposal.

L. SPECIFIC SUBJECTS, GRADE AND AGE LEVELS: Physics; fourth year high school; 16-17 years.

M. DESCRIPTION OF MATERIALS ALREADY PRODUCED:
1. Prototypes.
2. Student manuals.
3. Teacher's guide on mechanics.

N. MATERIALS AVAILABLE FREE: None.

O. MATERIALS PURCHASABLE: None.

P. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

Q. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: None.

R. PROJECT IMPLEMENTATION: The project has not yet been implemented.

S. PROJECT EVALUATION: No evaluation has been made since the project will be implemented on July 1, 1968.

T. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: (Not previously reported).

U. PLANS FOR THE FUTURE: July 1, 1968 - June 30, 1969: Summer training for 6 science supervisors, 6 physics teachers and 2 technical representatives from 2 zones; production of physics equipment by 2 trade schools for the Manila zone. July 1, 1969 - June 30, 1970: Production of physics equipment for Marawi and Cebu zones; academic training for 9 physics teachers from the Cebu and Marawi zones; summer training for 3 physics teachers, 12 science supervisors, and technical representatives. July 1, 1970 - June 30, 1971: Production of physics equipment for 6 new zones; academic training for 25 physics teachers; summer training for 11 physics teachers, 12 science supervisors, and 6 technical representatives. July 1, 1971 - June 30, 1972: Production of physics equipment for 6 new zones; academic training for 25 physics teachers; summer training for 11 physics teachers.

A. PROJECT TITLE: SCIENCE EDUCATION CENTER, UNIVERSITY OF THE PHILIPPINES (SEC).

B. PROJECT DIRECTOR: Dolores F. Hernandez, Science Education Center, University of the Philippines, Diliman, Quezon City, Philippines. Tel. 9-35-80.

C. PROJECT HEADQUARTERS:
1. Contact: Director, Science Education Center.
2. Special facilities or activities available for visitor viewing: Try-out classes starting July, 1967.

D. PRINCIPAL PROFESSIONAL STAFF: Consuelo V. Asis, Chairman, Biology Work Group; Josefina Fonacier, Chairman, Mathematics Work Group; Porfirio Jesuitas, Chairman, General & Elementary Science Work Group; Segundo Roxas, Chairman, Physics Work Group; Pilar da Silva, Chairman, Chemistry Work Group; Aurora Miñoza, Chairman, Evaluation Committee; Robert Ward, Project Consultant; Angelina Ramirez, Vice-chairman, Evaluation; Alegria Lacsamana, Asst. Chairman, Elementary School Mathematics; Leticia Cortes, Asst. Chairman, High School Science I; Julieta Savellano, Asst. Chairman, High School Science II.

E. PROJECT SUPPORT:
1. Organizational sponsorships: University of the Philippines; Department of Education; National Science Development Board.
2. Funding agencies: The Ford Foundation; University of the Philippines; National Science Development Board.

F. PROJECT HISTORY:
1. Principal originators: Dr. Augusto Tenmatay, Dr. Enrique T. Virata, Dr. Dolores F. Hernandez.
2. Date and place of initiation: November 1, 1964; University of the Philippines.
3. Reason for initiation: Recognized need for improving science and mathematics textbooks locally produced for use in elementary and secondary schools of the country; also, the need to set a model of curriculum development which hopefully will establish a pattern for activities by other groups in the country.

G. PRESENT COMMERCIAL AFFILIATIONS: None for the present.

H. PURPOSES AND OBJECTIVES: To prepare curriculum materials (student texts teacher's guides and laboratory manuals) for elementary and secondary school math and science. Major guidelines for the preparation of materials are: (1) to make science education more responsive to the needs of the country; (2) to use science and technology effectively in the achievement of national goals; (3) to produce scientifically literate citizens; (4) to stimulate the choice of scientific and allied careers by those with the corresponding aptitudes and thus increase the number of scientists, technologists, and technicians; (5) to communicate the excitement and aspiration of scientific endeavors and to increase the power of innovation and invention through an awareness of the methods of science; (6) to emphasize

imaginative inquiry and promote skills for independent learning than dogmatic assertion and memorization of facts. There projects differ from other local activities in having a staff devoting full-time to this work and in including a tryout program with intensive evaluation.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Programmed instruction; laboratory investigations; lectures; seminars; discussion groups.

J. ORIENTATIONS OF STATED OBJECTIVES: Content mastery; process acquisition; scientific literacy.

K. LOCATION OF LIST OF OBJECTIVES: Teacher's Guide.

L. SPECIFIC SUBJECTS, GRADE AND AGE LEVELS:

Subject and Grade	Age level
Elem. sci. (grades 1-6)	7-12
Elem. math (grades 1-6)	7-12
H.S. sci. I	13
H.S. sci. II	14
Chemistry	15
Physics	16
H.S. math I	13
H.S. math II	14
H.S. math III and IV	15

M. DESCRIPTION OF MATERIALS ALREADY PRODUCED: The following have been produced (experimental editions) and are being tried out during the school year 1967-68 and 1968-69:
1. Elementary School Science grades 1, 2, and 3 (teacher's guide only) mimeographed.
2. Chemistry for Philippine High Schools.
3. Fundamentals of Physics.
4. High School Math I.
5. High School Math II.
6. High School Math III.
7. The Gene (for high school teachers).

N. MATERIALS AVAILABLE FREE: None except for brochure and newsletters.

O. MATERIALS PURCHASABLE: Biology for Philippine High Schools (textbook, ₱16.90; Lab. manual, ₱10.90; teacher's guide, ₱6.25, (₱3.86 = $1.00); Alemar's, 769 Rizal Ave., Manila.

P. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

Q. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: None planned.

R. PROJECT IMPLEMENTATION:
1. Number of teachers using materials:

	High School	Elementary	Overall
July	41	20	61
January	35	20	55

2. Number of students involved:

	High School	Elementary	Overall
July	3,372	784	4.156
January	2,637	784	3,421

3. Number of schools involved:

	High School	Elementary	Overall
July	20	6	26
January	15	6	21

4. Sources of totals in 1, 2, and 3 above: Distance of schools from the University; willingness of teachers and administrators to participate, and to support the program; willingness of teachers to attend the special summer institute to prepare them to use the materials; number of teachers and students that could be handled by SEC staff and budget.

5. Name and location of specific schools where course is being taught: The following is a partial listing: Araullo High School, Taft Avenue, Manila; Dalubhasaang Epifanio delos Santos High School, Malabon, Rizal; Manuel L. Quezon High School, Molave, Tondo, Manila; Marcelo H. del Pilar H. Sch., Malolos, Bulacan; Rizal High School, Pasig, Rizal; Quezon City High School, Quezon City; St. Scholastica's College, Leon Guinto St., Manila; U.P. High School, Diliman, Quezon City. The elementary schools include: Darangan Elementary School, Binangonan, Rizal; Quirino Elem. Sch., Project 2, Quezon City; Pura V. Kalaw Elem. Sch., Project 4, Quezon City; P. Gomez Elem. Sch., P. Guevarra, Sta. Cruz, Manila; Tayuman Elem. Sch., Binangonan, Rizal; U.P. Elem. School, Diliman, Quezon City.

6. Availability of consultants for teachers: SEC chairmen are available; also, special lecturers for specific topics are sometimes provided by SEC during monthly meetings with experimental teachers.

7. Activities conducted for in-service teacher training: Since summer, 1967 special institutes have been run to prepare the experimental teachers to use the materials.

a. Summer Institute for teacher training on the BSCS adaptation has been run at various schools and Universities for several summers. They have been sponsored by National Science Development Board and have included lectures, films, intensive lab work, and field trips using Biology for Philippine High Schools.

b. Courses are being offered at U.P. under the direction of SEC to train the teachers who will be involved in the try-outs of the materials.

8. Implementation procedures in addition to above: SEC staff serve as consultants to schools/educational organizations interested in using SEC materials.

9. Implementation procedure, seemingly, the most effective: Special institutes developed about the materials and handled by SEC staff.

10. How evaluated: No formal evaluation done; but from such institutes teachers are chosen who are capable of helping other teachers through workshops, work conferences, etc.

S. PROJECT EVALUATION:

1. Evaluation conducted by: An evaluation committee composed of a chairman (part-time), a vice-chairman (full-time), the director, and consultant of the project. Staff assigned to evaluation include 3 full-time research assistants and 3 clerks (part-time).
2. Instruments used: Achievement tests developed for each course by the SEC staff and writers; POST test (for the biology group); the Otis Intelligence test.
3. Control groups:

	High School	Elementary	Overall
Total no. of teachers July-January	29	20	49
No. of class sections	34	20	54
No. of pupils	1,361	797	2,158
No. of schools	11	20	31

The control classes were chosen by recommendation of school administrations on the bases of: (a) teachers using traditional materials; (b) classes handled were somewhat comparable to the experimental classes in section assignment.
4. Feedback process: Reactions on the materials are obtained from (a) teachers handling the materials; (b) students studying the materials; (c) subject chairmen and specialists observing classes; and (d) curriculum specialists (supervisors and administrators). These reactions are recorded in either the fully-structured or the open-ended forms. Information obtained from the feedback is interpreted both qualitatively and statistically.
5. Research evidence of objectives achieved: Performance of students on achievement tests indicate achievement of most objectives. Teacher feedback and student feedback support this.
6. Availability of evidence: Not available at present. Raw data may be used by graduate students of the University for research studies with approval of Evaluation Committee Chairman and Director. A report will be prepared at the end of the current academic year.

T. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: Evaluation program for the courses listed in Section M started in July 1967, and will continue to April 1968. Visitation of classes, monthly meetings with experimental teachers, development of achievement tests have been continuing activities.

U. PLANS FOR THE FUTURE: Expect to have by mid-year the following materials ready for use in experimental schools: Elementary Science 4; Elementary Math 1, 2, and 3; High School Math III; Geometry and General Science I (Part I).

A. PROJECT TITLE: THE SCANDINAVIAN PHYSICS PROJECT FOR THE MODERNIZING OF THE HIGH SCHOOL PHYSICS.

B. PROJECT DIRECTOR: K. G. Friskopp, Lansskolnamnden, Drottninggatan 29, Orebro, Sweden. Tel. 019/ 12 44 40.

C. PROJECT HEADQUARTERS:
1. Contact: Project Director, The Scandinavian Physics Project for the Modernizing of the High School Physics.
2. Special facilities or activities available for visitor viewing: During the school year visits to the schools are possible.

D. PRINCIPAL PROFESSIONAL STAFF: A number of different persons have worked on the project at various times.

E. PROJECT SUPPORT:
1. Organizational sponsorship: Formerly O.E.C.D., Paris.
2. Funding agencies: The Governments in Finland, Norway and Sweden.

F. PROJECT HISTORY:
1. Principal originators: E.S.I. and O.E.C.D.
2. Date and place of initiation: 1961; Cambridge, G.B.
3. Reason for initiation: A wish to have the PSSC-ideas presented for Scandinavian pupils.

G. PRESENT COMMERCIAL AFFILIATIONS: None described.

H. PURPOSES AND OBJECTIVES: To renew school physics in the gymnasium (High School level) in Scandinavia on bases of the PSSC-physics program. The first Scandinavian edition followed fairly close the first American edition with an addition in quantum physics. The second Scandinavian edition, worked out in close cooperation with E.S.I., will contain most of the PSSC Advanced topics, but not so much PSSC part one.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: (Not answered).

J. ORIENTATIONS OF STATED OBJECTIVES: (Not answered).

K. LOCATION OF LIST OF OBJECTIVES: (Not answered).

L. SPECIFIC SUBJECTS, GRADE AND AGE LEVELS: Gymnasium physics dealing with all parts of physics; grades 10-12; age levels 16/17 - 18/19.

M. DESCRIPTION OF MATERIALS ALREADY PRODUCED:
1. Fysik I-IV, 1962-63 - Universitetsforlaget, Oslo, Norway.
2. Fysik I-V, 1962-65 - Biblioteksforlaget NKI, Stockholm, Sweden.
3. Fysik I, 1967 - Biblioteksforlaget, Stockholm.

N. MATERIALS AVAILABLE FREE: None.

O. MATERIALS PURCHASABLE: Items 1 and 3. Item 2 is out of print.

P. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: First edition, Norwegian and Swedish. Second edition will appear in Finnish,

Norwegian and Swedish.

Q. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: None.

R. PROJECT IMPLEMENTATION:

1. Number of teachers using materials: About 100.
2. Name and location of specific schools where course is being taught: Ekenas, Samlyceum, Ekenas, Finland; Oslo Teniske gymnas, Oslo, Norway; Rudbeckianska skolan, Vasteras, Sweden.

S. PROJECT EVALUATION: The evaluation of the first pilot course has not yet taken place. The teachers taking part in the pilot course meet once per year and during this meeting the experiences from the last school year are discussed.

T. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: Part II, Mechanics, has been published.

U. PLANS FOR THE FUTURE: Part III, Electricity, will appear in March in Swedish.

A. PROJECT TITLE: CANARY ISLANDS MATHEMATICS PROJECT (C.I.M.P.).

B. PROJECT DIRECTOR: Julián B. Caparrós Morata, Dr. Fleming-10 (Escaleritas), Las Palmas de Gran Canaria, Canary Islands-Spain.

C. PROJECT HEADQUARTERS:
1. Contact: Julián B. Caparrós Morata, María Encarnación Delgado, C.I.M.P.
2. Special facilities or activities available for visitor viewing: One day each week people can visit the children working in the school. After the visit, explanations are available.

D. PRINCIPAL PROFESSIONAL STAFF: Julián B. Caparrós Morata, Director; María Encarnación Delgado, Teacher-head.

E. PROJECT SUPPORT:
1. Organizational sponsorship: (Not answered).
2. Funding agency: (Not answered).

F. PROJECT HISTORY:
1. Principal originators: Julián B. Caparrós Morata; María Encarnación Delgado.
2. Date and place of initiation: 1965; Las Palmas de Gran Canaria.
3. Reason for initiation: The bad position of Spanish didactics and the necessity of an experiment in order to check our possibilities for improvement.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PURPOSES AND OBJECTIVES: See the first Report on the Canary Islands Mathematics Project. Main characteristics of the project: Learning against teaching; experimentation against verbalisation.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study; laboratory investigations; lectures; seminars; discussion groups; cards.

J. ORIENTATIONS OF STATED OBJECTIVES: Process acquisition; attitudinal changes.

K. LOCATION OF LIST OF OBJECTIVES: First Report on the Canary Islands Mathematics Project.

L. SPECIFIC SUBJECTS, GRADE AND AGE LEVELS: (Not answered).

M. DESCRIPTION OF MATERIALS ALREADY PRODUCED: The children are working with a great variety of structured materials and several hundred work cards.

N. MATERIALS AVAILABLE FREE: First Report on the Canary Islands Mathematics Project-1967. Free to individuals as long as the supply lasts; contact Dr. Zoltan P. Dienes-1382 rue Dominion, Sherbrooke, Province de Quebec, Canada.

O. MATERIALS PURCHASABLE: None.

P. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

Q. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: (Not answered).

R. PROJECT IMPLEMENTATION:

1. Number of teachers using materials: Today only the pilot school.
2. Number of students involved: Only the forty pupils of the first pilot school.
3. Name and location of specific schools where course is being taught: Grupo Escolar "Isabel la Catolica", Dr. Woeffel-2, (Escaleritas)-Las Palmas de Gran Canaria, Canary Islands, Spain.
4. Availability of consultants for teachers: The CIMP has an information service for several teachers interested in the project.
5. Activities conducted for in-service teacher training: Information; explanations; comments; criticism; lecture on projects and books; exhibitions.
6. Implementation procedures in addition to above: (Not answered).
7. Implementation procedure, seemingly, the most effective: To visit the children at work.
8. How evaluated: (Not answered).

S. PROJECT EVALUATION:

1. Evaluation conducted by: The director.
2. Instruments used: Tests.
3. Control groups: Compared the progress of the pilot pupils with the progress of the pupils of the same school working with the traditional methods.
4. Feedback process: (Not answered).
5. Research evidence of objectives achieved: Examinations, exhibitions; note the process of good reasoning in the pupils.
6. Availability of evidence: (Not answered).

T. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: A large number of teachers have visited the pilot school during 1967. From July 10-16, 1967, the school had its second exhibition with a total success.

U. PLANS FOR THE FUTURE: To improve the work. To prepare the next exhibition. Only when Spanish teachers have Spanish books will it be possible to consider the possibilities of expansion. In the meantime, the Canary Islands Mathematics Project must continue as the only pilot school, since the pedagogical level of the Spanish teacher is not the convenient one, today. And to publish a bulletin.

A. PROJECT TITLE: INTRODUCTION OF SOME CONCEPTS IN MATHEMATICS TO PRIMARY AND SECONDARY SCHOOLS.

B. PROJECT DIRECTOR: Sair Ali Shah, Institute of Education, University of the West Indies, St. Augustine, Trinidad, West Indies.

C. PROJECT HEADQUARTERS:
1. Contact: Sair Ali Shah, Introduction of Some Concepts in Mathematics to Primary and Secondary Schools.
2. Special facilities or activities available for visitor viewing: Some primary and secondary schools where concepts are tried.

D. PRINCIPAL PROFESSIONAL STAFF: Sair Ali Shah, Lecturer, Institute of Education.

E. PROJECT SUPPORT:
1. Organizational sponsorship: Institute of Education, University of the West Indies.
2. Funding agency: Institute of Education, U.W.I.

F. PROJECT HISTORY:
1. Principal originators: Conference in Math Education, sponsored by Math. Association of Trinidad & Tobago in August 1963.
2. Date and place of initiation: August 1963; Trinidad, West Indies.
3. Reason for initiation: To help teachers and children to keep abreast with current trends in mathematics education.

G. PRESENT COMMERCIAL AFFILIATIONS: (Not answered).

H. PURPOSES AND OBJECTIVES: To observe children's (age range 5 to 11) reactions to the following topics: (a) modern geometry; (b) sets; (c) number systems with different bases. These topics are taught using the following psychological principles: (a) proceeding from the concrete to the abstract; (b) Piaget's principle of conservation; (c) Piaget's principle of reversibility (d) Wertheimer's idea of structural thinking.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Seminars; discussion groups; trials with teachers from teachers' colleges during teaching practice.

J. ORIENTATIONS OF STATED OBJECTIVES: Content mastery; process acquisition; attitudinal changes.

K. LOCATION OF LIST OF OBJECTIVES: (Not answered).

L. SPECIFIC SUBJECTS, GRADE AND AGE LEVELS: Age range 5 to 11+: modern geometry, sets. Age range 12 to 16: sets, number systems, 'motion' geometry.

M. DESCRIPTION OF MATERIALS ALREADY PRODUCED:
1. Sair Ali Shah, Principles of Teaching Mathematics, published by Longmans, Green & Co. Ltd., United Kingdom.
2. A Series of Booklets: "Ideas in Mathematics" published for

Ministry of Education, Trinidad.
3. Shah and Camacho, "Mathematics Around Us". First of a math series for primary grades (5 to 11).
4. A Report on an Expt.: Modern Geometry for Children (ages 5 to 11).
5. Report on an Expt.: Sets for Children (ages 5 to 11).
6. Syllabus for primary grades (ages 5 to 11).

N. MATERIALS AVAILABLE FREE: (Not answered).

O. MATERIALS PURCHASABLE: From Longmans, Green & Co. Ltd., 48 Grosvenor Street, London W.1., United Kingdom: Item 1 about $1.25 (U.S.); Item 3 about $1.00 (U.S.).

P. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

Q. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: (Not answered).

R. PROJECT IMPLEMENTATION:
1. Number of teachers using materials: Over 2,000 using item 1; over 500 using item 2.
2. Number of students involved: (Not answered).
3. Number of schools involved: About 450 primary schools.
4. Sources of totals in 1, 2, and 3 above: Primary schools in Trinidad and Tobago are about 500. Most schools use the program.
5. Name and location of specific schools where course is being taught: Most primary schools in Trinidad.
6. Availability of consultants for teachers: Teachers are free to call at the Institute of Education for advice.
7. Activities conducted for in-service teacher training: Courses at fortnightly intervals. One Friday every two weeks teachers meet to discuss a topic, which they try at schools. Seminars during July - August.
8. Implementation procedures in addition to above: Working in close cooperation with the Ministry of Education in Trinidad. Getting supervisors (superintendents of schools) to attend courses. Fortnightly courses followed by material.
9. Implementation procedure, seemingly, the most effective: Obtaining Ministry's blessing and conducting fortnightly courses followed by use of trial materials.
10. How evaluated: (a) Actual observations of what is taught in schools; (b) when teachers' return for courses they discuss material tried.

S. PROJECT EVALUATION:
1. Evaluation conducted by: Sair Ali Shah.
2. Instruments used: Objective tests (to date): (a) one on modern geometry; (b) one on sets.
3. Control groups: Not strictly, since the program is introduced on an island-wide scheme.
4. Feedback process: Reactions of children on test performance.
5. Research evidence of objectives achieved: Report on: (a) Expt. on modern geometry for children, 5-11 years; (b) Expt. on

sets for children, 5-11 years.

6. Availability of evidence: Available by writing to Sair Ali Shah.

T. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: Preparation of reports on experiments in geometry and sets for age group five to eleven plus.

U. PLANS FOR THE FUTURE:

1. Fortnightly courses: One day every two weeks - starting February 1968.
2. Conference of teachers in September 1968.

A. PROJECT TITLE: SCIENCE EDUCATION DEVELOPMENT COMMISSION, BOARD OF EDUCATION OF THE MINISTRY OF EDUCATION.

B. PROJECT DIRECTOR: Zekai Baloglu, Chairman of the Board of Education, Ministry of Education, Ankara, Turkey.

C. PROJECT HEADQUARTERS:
1. Contact: Remzi Erkoc, Secretary General of the Science Education Development Commission, Science Lise of Ankara, Turkey, Ankara Fen Lisesi, Ankara, Turkey.
2. Special facilities or activities available for visitor viewing: Curriculum development, writing activities, equipment center.

D. PRINCIPAL PROFESSIONAL STAFF: Rauf Nasuhoglu, Physics, Science Faculty, Ankara University; Vedat Enustun, Chemistry, Middle-East Technical University; Esat Egesoy, Mathematics, Ankara Science Faculty; K. Karamanoglu, Biology, Ankara University.

E. PROJECT SUPPORT:
1. Organizational sponsorships: Ford Foundation, Turkish Ministry of Education, Turkish Scientific and Technical Research Council.
2. Funding agencies: Turkish Ministry of Education and Ford Foundation.

F. PROJECT HISTORY:
1. Principal originators: Turkish Ministry of Education and Ford Foundation.
2. Date and place of initiation: April 1962; Ankara, Turkey.
3. Reason for initiation: To improve science education in Turkish high schools and initiate an improvement in science education in Turkey.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PURPOSES AND OBJECTIVES: To adapt modern curriculum materials for use in Turkish high schools and to educate the teachers in the use of these materials. Ten senior high schools and ten teacher training colleges are now selected as pilot institutions.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Laboratory investigations; lectures; discussion groups.

J. ORIENTATIONS OF STATED OBJECTIVES: Process acquisition; attitudinal changes.

K. LOCATION OF LIST OF OBJECTIVES: No such list of objectives is given in the books, but it is expressed in the whole texts.

L. SPECIFIC SUBJECTS, GRADE AND AGE LEVELS: Ninth to eleventh grade of high school (15 to 18 years old).

M. DESCRIPTION OF MATERIALS ALREADY PRODUCED:
1. Turkish Adaptation of PSSC Physics.
2. Turkish Adaptation of PSSC Advanced Topics.
3. Turkish Adaptation of CHEM Study.

4. Turkish Adaptation of BSCS Biology, blue version.
5. Turkish Adaptation of SMSG Geometry.
6. Basic Mathematics written in Turkish.

N. MATERIALS AVAILABLE FREE: Materials available through project in limited amount.

O. MATERIALS PURCHASABLE: All items can be purchased through Ministry of Education Publishing office.

P. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: Turkish.

Q. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: None.

R. PROJECT IMPLEMENTATION:

1. Number of teachers using materials: 130 teachers are using the modern curricula, some 200 readers using them to some degree.
2. Number of students involved: 2,189.
3. Number of schools involved: 20.
4. Sources of totals in 1, 2, and 3 above: By a count of each category.
5. Name and location of specific schools where course is being taught: Istanbul, Izmir, Ankara, Erzurum, Bursa.
6. Availability of consultants for teachers: National Science Lise teachers are visiting the pilot schools.
7. Activities conducted for in-service teacher training: Summer institutes for 300 teachers at Fen Lisesi, Ankara.
8. Implementation procedures in addition to above: A teacher's guide in science education in form of a periodical is published and sent free to teachers.
9. Implementation procedure, seemingly, the most effective: Summer Institutes.
10. How evaluated: By feedback questionnaire from students.

S. PROJECT EVALUATION:

1. Evaluation conducted by: Test and Measurement Bureau, Ankara, Turkey.
2. Instruments used: Tests prepared by ETS for PSSC Physics are used. CHEM Study and BSCS Tests are also used.
3. Control groups: None used.
4. Feedback process: Reports given by the teachers are evaluated by the subcommittee attached to the commission.
5. Research evidence of objectives achieved: Feedback reports and successes of the students at the University entrance examination.
6. Availability of evidence: Not available.

T. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: National Science Lise has sent its first graduates to universities; they did very well in entrance examinations. The present project is an extension of last four years work.

U. PLANS FOR THE FUTURE: The pilot schools teachers will make plans for further implementation.

A. PROJECT TITLE: UNESCO PILOT PROJECT FOR CHEMISTRY TEACHING IMPROVEMENT IN ASIA.

B. PROJECT DIRECTOR: Prof. Jaraslav Zyka, Director UNESCO Chemistry Pilot Project in Asia, P.O. Box 1425, Bangkok, Thailand.

C. PROJECT HEADQUARTERS:
1. Contact: Dr. R.H. Maybury, UNESCO Pilot Project for Chemistry Teaching Improvement in Asia, Division of Science Teaching, Department of Advancement of Science, UNESCO, Place Fontenoy, Paris 7e, France.
2. Special facilities or activities available for visitor viewing: The materials produced by the Project (see Section M) are available to visitors for viewing and for working with; and the staff of the Division of Science Teaching is available for discussions.

D. PRINCIPAL PROFESSIONAL STAFF: Sunt Techakumpuch, Chemistry Faculty of Chulalongkorn University, Counterpart to Professor Zyka; Hugo Herm, Associate Director (funded by Swedish Associate Expert Scheme); Denis Segaller, Film Consultant, (funded by Colombo Plan); M. Rawoff, Administrative Assistant.

E. PROJECT SUPPORT:
1. Organizational sponsorships: UNESCO and the Government of Thailand.
2. Funding agencies:
a. Bangkok laboratory centre: UNESCO and Government of Thailand; United Nations Development Programme, Technical Assistance Sector; Swedish Associate Expert scheme; Colombo Plan.
b. Fifteen study groups in Asia: UNESCO, local education authorities, and in several cases, UNDP Technical Assistance.

F. PROJECT HISTORY:
1. Principal originator: UNESCO.
2. Date and place of initiation: September 1965; Bangkok, Thailand.
3. Reason for initiationL To encourage science curriculum improvement in Asia.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PURPOSES AND OBJECTIVES: UNESCO's programme: To assist science educators in Asia in their task of carrying out reform of chemistry teaching along these lines, UNESCO has organized the Pilot Project for Chemistry Teaching in Asia. The project is operating along two major lines which are distinct but co-ordinates: (a) Modernization of chemical content and development of new teaching materials is the primary task of the Pilot Project Centre for research and development in chemistry teaching located in laboratories at Chulalongkorn University, Bangkok, Thailand. (b) Assistance to in-service and pre-service teacher training, studies and information on improvement of examinations, better textbooks, and use of the

latest methods of teaching - all school-oriented applications of the basic research of the Bangkok Centre - are tasks UNESCO is expecting the study groups to accept. At least one study group has been organized in each of the 15 Asian countries participating in this pilot project.

2. The Centre for Research and Development in Chemistry Teaching: This project is based upon research and development work in chemistry teaching of an International Working Group of chemistry teachers, scientists, and other consultants, drawn from universities and teacher-training colleges throughout Asia, and centred in a special laboratory and workshop at Chulalongkorn University in Bangkok, Thailand. Science educators come to the International Working Group (I.W.G.) under fellowships supplied by UNESCO, by governments and by foundations, for periods from three months to a year, and occasionally for shorter periods, to take part in basic research work into the actual chemistry content which is found in most school courses. These participants also take part in writing programmed instructional sequences, developing suitable chemical systems for student instruction, and making 8 mm short film loops. UNESCO is drawing to this centre recognized leaders of curriculum reform projects from different parts of the world, for example, from the Nuffield Chemistry Project in the U.K., the CHEM Study and C.B.A. projects in the U.S.A., and the Approach to Chemistry group in Australia, in order to share their experiences in a first-hand way with the Asian science educators participating in the I.W.G.

3. Formation of study groups for science teaching improvement: UNESCO has invited science educators in each Asian country to organize a Study Group for Science Teaching Improvement, which can affiliate with the Pilot Project as a means of receiving support and help in its work. UNESCO is assisting these study groups in several ways: by supplying experimental teaching materials (resource materials) prepared by the I.W.G. in Bangkok to stimulate local preparation of textbooks and other teaching materials; and by arranging for representatives from outstanding curriculum reform projects to visit study groups as consultants for in-service courses for teachers, or as consultants on curriculum reform and the preparation of teaching materials. Furthermore, members of the study groups have an opportunity to acquire valuable experience by becoming personally involved in basic work as participants of the IWG in Bangkok for a period of time.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study; programmed instruction; laboratory investigations; discussion groups.

J. ORIENTATIONS OF STATED OBJECTIVES: Content mastery; process acquisition; attitudinal changes.

K. LOCATION OF LIST OF OBJECTIVES: In prefaces to each published item of the teaching materials.

L. SPECIFIC SUBJECTS, GRADE AND AGE LEVELS: Unit 1, Stoichiometry (the quantitative relationships between reacting substances); Unit 2, Energy and Chemical Reactions; Unit 3, Chemical Equilibrium.

M. DESCRIPTION OF MATERIALS ALREADY PRODUCED: Unit 1, Introduction to Chemical Reactions (Stoichiometry):

1. Programmed Instruction Sequence, 1966. This programmed instruction booklet is integrated with film loops and laboratory work to help a student learn this basic topic in chemistry with minimum assistance from the teacher.
2. Teacher's Guide (to the above programmed sequence).
3. 8 mm Film Loops in Cassettes (for technicolor loop projectors only):
    a. Loop 1, Precision in Volume Measurement.
    b. Loop 2, Volume changes on Mixing Liquids I.
    c. Loop 3, Volume changes on Mixing Liquids II.
    d. Loop 4, Gas Reaction (Hydrogen & Oxygen).
    e. Loop 5, Changes on Mixing.
    f. Loop 6, Copper/Sulphur Pupil Experiment.
    g. Loop 7, Solid Solutions: Bronze Manufacture.
    h. Loop 8, Energy Transformations I.
    i. Loop 9, Energy Transformations II.
    j. Loop 10, Gas Reaction (Ammonia and hydrogen chloride).
4. Teachers' Guide to Film Loops. Notes and sample questions which a teacher may use in conjunction with each of the above film loops.
5. Compound Formation, A Teachers' Digest. A collection of the lectures, discussions, and laboratory work which comprised the first four week in-service course for Thai chemistry teachers (secondary school) organized by the Pilot Project Centre.

N. MATERIALS AVAILABLE FREE: Unit 1: Items 1, 2, 4, and 5 available from UNESCO Pilot Project for Chemistry Teaching Improvement, Box 1425, Bangkok, Thailand or UNESCO, Place Fontenoy, Paris 7. France.

O. MATERIALS PURCHASABLE: The film loops (Unit I, Item 3) may be purchased singly ($6.00) or as a set by writing to UNESCO Pilot Project for Chemistry Teaching Improvement, Box 1425, Bangkok, Thailand.

P. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: Unit I: English.

Q. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: Unit I: Items 1 and 2 in French.

R. PROJECT IMPLEMENTATION: In a "Guide to Study Groups" UNESCO has written to each group as follows:

1. Functions of study groups: A Study Group for Science Teaching Improvement can take initiative for curriculum reform in a country along several lines:
    a. A study group should identify key chemistry educators in a country, and provide the occasion for these educators

to meet for discussion of modern chemistry and newer teaching approaches. UNESCO will supply to study groups, for such discussion, copies of chemistry teaching materials developed in leading curriculum reform projects throughout the world, as well as the resource materials produced in the UNESCO Pilot Project. An example of the type of discussion that would be fruitful, is for the group to make a careful comparison among the various projects of the treatment of a particular topic, for example, energy changes accompanying material changes. This could lay the basis for the rewriting of this topic for school use by the study group or by a designated national science textbook writing team.

b. There is a need to experiment on a pilot scale with new programmes of study within a country before these new ideas are adopted on a broad scale throughout the country. A study group can play a very important role in curriculum reform by conducting this limited scale trial use of new materials brought into a country from projects elsewhere. Such a pilot scale programme could encourage science educators in a particular country to prepare their own science teaching materials, and to train their teachers through in-service courses to use this material.

c. The study groups can play a useful role by being in contact in appropriate ways with all relevant sections of the community. They should establish as priorities those aspects of curriculum reform which are vital to the success of the enterprise, for example the reform of examinations, and the retraining of teachers, and they should determine the proper sequence of steps to be taken by the various relevant groups. They should mobilize key groups to organize a curriculum reform programme.

2. Links between study groups and regional and international curriculum reform projects: A major purpose of UNESCO in inviting local study groups to affiliate with the Pilot Project for Chemistry Teaching in Asia is to help reduce the sense of isolation that many such groups experience. The reform of chemistry teaching in a particular country is not a once-for-all achievement; it is a continuous process of renewal, drawing inspiration from research in chemistry teaching which is taking place in many parts of the world. The UNESCO Pilot Project affords key science educators in Asia an opportunity to meet together for several months in an international centre for chemistry teaching improvement. A participant from one Asian country is able to discuss common problems in chemistry teaching with other participants from elsewhere, and to realize how similar many of the problems in other Asian countries are to those in his own. He has an opportunity to examine solutions successfully applied elsewhere in Asia, and to consider the suitability of these for providing effective

answers to similar problems in his own country. His own experience is likely to be helpful to some of the other participants.

In order to create something of this same kind of shared understanding among Asian study groups, and to assist them to see their activities as part of a world-wide effort to improve chemistry teaching, UNESCO suggests that each study group consider the value of links with the following organizations and groups:

a. UNESCO's Pilot Project Centre at Bangkok. The Centre can supply study groups with resource materials, and act as a clearinghouse for information about the activities of these groups. In return, study groups are asked to send to the Centre their comments on the resource materials supplied to them, and accounts of experiments which make use of these and other chemistry teaching materials; they are also asked to keep the Centre informed of their activities. Participants who have returned from Bangkok can be particularly helpful in making this link. Study groups are particularly urged to identify key science educators in their countries who might go to Bangkok for shorter or longer periods as participants.

b. Other curriculum reform groups within Asia and in other parts of the world. Study groups are invited to maintain those links with each other which have already been initiated through the personal contact of participants at the Pilot Project. Neighbouring countries may be able to arrange to participate in each others' activities, and UNESCO will arrange for visiting consultants travelling to one Asian country to visit other countries in the region. Direct links with major curriculum projects in countries such as Australia, the United Kingdom and the United States, may first be made through fellowships and visiting consultants (see Section R2c), and should be maintained through correspondence and exchange of information.

c. UNESCO Headquarters in Paris. UNESCO will assist study groups to keep themselves informed about recent developments in curriculum reform by responding wherever possible to requests from groups for the services of consultants from major curriculum reform projects, and will also provide groups with resource materials from these projects. UNESCO will also seriously consider requests to provide fellowships which enable study group members to take overseas courses in modern methods of teaching chemistry, and will advise on how such fellowships can most profitably be utilized. UNESCO field experts and staff of Higher Teacher Training Institutions who work as members of, or in close collaboration with, study groups, can be particularly helpful in making this link with Paris.

3. Study groups are assisted by UNESCO when various full-time visiting consultants in chemical education arrange to spend time with them. In each case, the Government of the country has requested UNESCO to supply this specialist under that country's participation in the UN Development Programme, Technical Assistance sector. Countries currently benefiting this way are Iran, Ceylon, Thailand, Pakistan, Philippines and China (Taiwan). The regular reports of these specialists describing their work with study groups are available by writing to UNESCO, Division of Science Teaching, Place Fontenoy 7, Paris, France.

S. PROJECT EVALUATION: No evaluation has been made to date.

T. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: A new activity was introduced into the Pilot Project Centre when a one-month Summer Institute for Thailand Teachers of Chemistry was organized. Forty teachers were brought to the project by the Thai government and an additional financial contribution was given by the Asia Foundation in support of honoraria for Thai Institute staff and the publishing of the proceedings in the Thai language. The UNESCO Regular Budget provided travel and fees to seven outstanding university scientists who served as lecturers and laboratory workshop advisers, while six professors of chemistry from Chulalongkorn University and three senior Ministry of Education staff served as laboratory workshop and discussion group leaders. The Summer Institute thus gave an example so far unique of co-operation between scientists and teachers for an in-service up-grading of teachers. This same activity was again conducted in December 1967 for an additional group of Thai teachers drawn largely from the staff of teacher-training colleges on this occasion with Thai lecturers as well as Thai group leaders.

U. PLANS FOR THE FUTURE: During the current year (1968) the Pilot Project staff and participants from countries in Asia will elaborate additional resource materials for units II (Energy and Chemical Reactions) and III (Chemical Equilibrium). The staff will conduct an in-service course for chemistry teachers in Thailand. Between 15 July and 23 July a Joint International Atomic Energy Agency/UNESCO Panel on the Teaching of Nuclear Science will convene at the Project. The staff of the project will co-operate with the Committee on the Teaching of Chemistry of IUPAC in convening a conference in Colombo, Ceylon (August) on Examinations and Testing in Chemistry Teaching.

A. PROJECT TITLE: UNESCO PILOT PROJECT ON THE TEACHING OF PHYSICS IN LATIN-AMERICA.

B. PROJECT DIRECTOR: Dr. Par Bergvall. (Dr. Bergvall died in 1965, and since then the Project is being coordinated directly from the Division of Science Teaching of UNESCO.)

C. PROJECT HEADQUARTERS:
1. Contact: Dr. N. Joel, UNESCO Pilot Project on the Teaching of Physics in Latin-America, Division of Science Teaching, Department of Advancement of Science, UNESCO, Place Fontenoy, Paris 7, France. Tel. 566-5757.
2. Special facilities or activities available for visitor viewing: The materials produced by the Project (see Section M) are available to visitors for viewing and for working with them; and the staff of the Division of Science Teaching is available for discussions.

D. PRINCIPAL PROFESSIONAL STAFF: Albert V. Baez, former Director of the Division of Science Teaching of UNESCO, 1961-1967; Par Bergvall, Director of the Project; Nahum Joel, Assistant-Director of the Project; Francis Mechner, Specialist in Programmed Learning and Behavioral Technology; Le Xuan, Specialist in Programmed Learning; Herman Engel, Specialist in Film and TV; Peter Robinson, Specialist in Film and TV; and 26 physics teachers from eight Latin-American countries.

E. PROJECT SUPPORT:
1. Organizational sponsorships: UNESCO and IBECC (Instituto Brasileiro de Educacao, Ciencia e Cultura, Sao Paulo).
2. Funding agencies: UNESCO and IBECC. Fellowships were financed by CLAF (Centro Latino-Americano de Fisica, Rio de Janeiro) and by other sources.

F. PROJECT HISTORY:
1. Principal originator: Dr. Albert V. Baez (UNESCO).
2. Date and place of initiation: July 1963; IBECC, Sao Paulo, Brazil.
3. Reason for initiation: To encourage science curriculum improvement in L -America.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PURPOSES AND OBJECTIVES: To give a group of Latin-American physics teachers an opportunity to become trained in physics curriculum improvement through active participation in a specific project. The subject chosen for this work was the 'Physics of Light' as part of a secondary school physics course. The course produced places emphasis on the laboratory work done by the students and on the integration of this with their theoretical work; for this purpose the work with the lab kits is intimately combined with the texts (programmed learning manuals) developed by the Project. In fact, the texts cannot be utilized without the kits. The media of film and TV were also explored.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study; programmed instruction; laboratory investigations; discussion groups; the lab experiments are an indispensable part of the work with the programmed learning manuals.

J. ORIENTATIONS OF STATED OBJECTIVES: Process acquisition; attitudinal changes.

K. LOCATION OF LIST OF OBJECTIVES: In the report, which is available in Spanish, English, and French.

L. SPECIFIC SUBJECTS, GRADE AND AGE LEVELS: The "Physics of Light" as part of a physics course at the secondary school level.

M. DESCRIPTION OF MATERIALS ALREADY PRODUCED:
1. A programmed-learning text (both a Spanish and a Portuguese version) in five units: (0) Experiments and graphs, (1) Some fundamental properties of light, (2) A particle model for light, (3) A wave model for light, (4) Electromagnetic waves - Photons.
2. A set of eight laboratory kits with which the students do their experiments as they work through the programmed text.
3. Eleven short silent films (average time, 4 to 5 minutes each). A booklet containing teachers' guides (in Spanish) for these films has also been produced.
4. A 16 mm film (sound, 30 minutes) on the subject "Light, ... is it a wave?"
5. Scripts for eight TV programs as a complement to this course.
6. A detailed report (with illustrations) on the Project is available, in Spanish, in English, and in French.

N. MATERIALS AVAILABLE FREE: Item 6, the report "UNESCO Pilot Project on the Teaching of Physics" is available in Spanish, English, or French from Division of Science Teaching, Department of Advancement of Science, UNESCO, Place Fontenoy, Paris 7, Franch.

O. MATERIALS PURCHASABLE: Item 1, the texts (second edition, revised) can be purchased from ENOSA, Maria de Molina 12, Apartado de Correos 19042, Madrid 12, Spain. Item 2, the lab kits can be purchased either from ENOSA; or from IBECC, Caixa Postal 2921, Sao Paulo, Brazil.

P. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: Spanish and Portuguese.

Q. LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: English and French versions are being envisaged.

R. PROJECT IMPLEMENTATION: The course-materials developed by the Project were produced in Sao Paulo on a pilot scale in 1964. After one year of work at the Project, the Latin-American physics teachers who took part in it returned to their respective countries. Since then, they have been testing the materials with students and also making them known to

other teachers. With the feedback thus obtained, some of the participants have contributed to a revised version of the texts in Spanish printed by ENOSA (Madrid). UNESCO is making available small numbers of the texts and kits to teachers interested in holding further trials and reporting their results. Some of the Project participants are available as consultants to assist in such work. Furthermore, a series of Regional (Latin-American) Seminars on New Approaches and New Materials for the Teaching of Physics is being sponsored by UNESCO in cooperation with the educational authorities of the respective host countries. Five have taken place already (Sao Paulo, Caracas, Montevideo, Bariloche, Tegucigalpa), the sixth one being held in May 1968 (Santiago de Chile). At these seminars, of four weeks duration each, some of the Project participants present the result of their work; and other recent physics teaching projects are presented by some of their main authors (Nuffield and Harvard at the May 1968 Seminar). Most of the time at these seminars is spent in laboratory work and subsequent discussions. In this way, these seminars hope to encourage physics curriculum improvement as well as the local adaptation and development of new course materials.

S. PROJECT EVALUATION: No formal evaluation yet. Only feedback from some of the Project participants (they can make their reports available to interested individuals).

T. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: (Not previously reported).

U. PLANS FOR THE FUTURE: Production of an English and a French version of the texts; further testing of the Project materials, including also other regions of the world; possibly also other writing conferences.

SYNOPSES

The following are brief descriptions of projects in the preliminary stages of development throughout the world or of efforts in fields related to curriculum development.

1. TCCU AFGHANISTAN CURRICULUM PROJECT.
CONTACT: Chief of Party, USAID/TCCU Kabul, Department of State, Washington, D.C. 20521.

This project was established to develop a fractional entity responsible for, and capable of, continuing curriculum development for Afghanistan's primary schools. By 1973, it is hoped that Afghanistan will be able to undertake continuing creation and production of primary school textbooks, teachers' guides and supplementary teaching materials and to prepare these based on a new curriculum. Working papers have been drawn up and work has begun on the establishment of a curricular framework and on procedures for producing materials.

2. ALBERTA ELEMENTARY SCIENCE PROJECT.
CONTACT: Prof. Neil M. Purvis, Department of Elementary Education, University of Alberta, Edmonton, Alberta. Tel. 432-3670.

This project is designed to evaluate developing programs and materials in Alberta school systems. A field survey has been conducted in all parts of Alberta to determine the local resources which can be used in the elementary classroom. Cooperative in-service projects, with the Alberta Teachers Association science specialist council, are designed to assist teachers in becoming familiar with new approaches.

3. SCIENCE EDUCATION FOR ELEMENTARY SCHOOLS AND HIGH SCHOOLS, K-12.
CONTACT: Dr. T.P. Koh, Science Education Center, Chinese Cultural College, P.O. Box 5052, Taipei, Taiwan, China.

The Science Education Center is devising cooperative projects for improving science education with area elementary schools and high schools. The elementary project will adapt the Science Curriculum Improvement Study materials as a core and use Elementary Science Study and AAAS Science-A Process Approach materials as supplementary sources.

For the junior high school the 7th and 8th grade units of the Intermediate Science Curriculum Study will be used. In the 9th grade either the Intermediate Science Curriculum Study or the Earth Science Curriculum Project will be adapted.

The Biological Sciences Curriculum Study, yellow version, is being used in the 10th grade (see page of this Report). The Chemical Education Material Study Project and either the Physical Science Study Committee or Harvard Project Physics are envisaged for the 11th and 12th grades.

4. STUDY GROUP FOR CURRICULUM DEVELOPMENT.

CONTACT: Prof. René J. Montero, Departamento de Física, Instituto de Superacíon Educacional, c/o Centro Regional de la UNESCO para el Hemisferio Occidental, Calzada No. 551, esq. a D. Vedado, La Habana, Cuba.

This study group has worked experimentally with PSSC, CHEM Study, Nuffield Physics and UNESCO Physics materials in the Cuban schools. They are presently collecting data and have not begun production of materials at this time.

5. CENTRE FOR CURRICULUM RENEWAL AND EDUCATIONAL DEVELOPMENT OVERSEAS (CREDO).

CONTACT: Mr. Robert W. Morris, CREDO, Tavistock House South, Tavistock Square, London WC1, England. Tel. EUS-0166, EUS-6967.

This Centre created by the Ministry of Overseas Development and the Nuffield Foundation in 1966, attempts to coordinate requests for assistance with curriculum projects overseas, to respond to such requests and to offer advice on possible sources of assistance. A brochure describing CREDO's aims and objectives is available from CREDO headquarters.

6. JUNIOR SCIENCE PROJECT.

CONTACT: Mr. L.F. Ennever, Junior Science Project, 9 Tyndall Avenue, Bristol 2, England. Tel. Bristol 2-4161, ext. 738 or 739.

This project will produce materials for teachers to help them lead pupils (ages 5-13) in learning science by discovery methods. Topics being developed are "Metals" and "Trees". The project will use a variety of instructional methods to help pupils to think and act in an independent manner.

7. MATHEMATICS AND THE DIRECT TRAINING OF BASIC CONCEPTUAL SKILLS.

CONTACT: Mr. John D. Williams, Mathematics and the Direct Training of Basic Conceptual Skills, 79 Wimpole Street, London W.1., England. Tel. WEL-8335.

This project is investigating the relationship between learning of modern mathematics and the development of basic conceptual skills. It is an effort to establish whether the modern mathematics curriculum studied at the age of 7-10 years brings cognitive benefits of a general kind. The mathematics instruction uses the materials prepared by Dr. Dienes(see page of this Report). A large battery of tests involving different conceptual skills is used in the evaluation. This pilot study is scheduled to be completed in 1969, and any evidence gathered will be available on application to the National Foundation for Educational Research in England and Wales.

8. NUFFIELD SCIENCE TEACHING PROJECT: A-LEVEL PHYSICS COURSE.

CONTACT: Dr. P.J. Black or Mr. J.M. Ogborn, Nuffield A-Level Physics, Department of Physics, University of Birmingham,

P.O. Box 363, Birmingham 15, England.

This is a new course in physics for the sixth forms (ages 16-18) in British Schools, intended to last two years and to occupy about one quarter of the pupil's total school commitment. A variety of methods of instruction will be used. No materials have been published yet; school trials will begin in September of 1968 with publication of the revised materials scheduled for 1970. A general account of the project is available from the organizers.

9. ALTERNATIVE SYLLABUSES IN PHYSICS AND CHEMISTRY FOR SECONDARY SCHOOLS.

CONTACT: Mr. A.J. Mee, Alternative Syllabuses in Physics and Chemistry, Scottish Education Department, 5/6 Randolph Crescent, Edinburgh 3, Scotland. Tel. 031-226-3953/4.

These syllabuses, which were prepared to modernize science teaching in Scottish secondary schools and to improve teaching methods, have now been adopted successfully by all secondary schools preparing candidates for the Scottish Certificate of Education. They are being kept under constant review. The first revised version is scheduled to appear in 1968 and will incorporate changes suggested by past experience.

10. PHYSICS FOR PRE-MEDICAL STUDENTS.

CONTACT: Hisakichi Kanazawa, Physics for Pre-Medical Students, Keio University, Physics Department, Hiyoshi, Kohokiu-Ku, Yokohama-city, Japan.

This is an attempt to provide improved physics instruction in a more comprehensive way than has been done previously. By the use of demonstrations, laboratory investigations, some PSSC films, and programmed instruction, it is hoped that physics can be taught in the context of general education instead of being a specialty taught in response to certain examination requirements. An informal evaluation is provided by the students to the instructor.

11. SCIENTIST'S APPROACH TO PHYSICS EDUCATION.

CONTACT: Prof. Yoshinobu Kakiuchi, Scientist's Approach to Physics Education, Institute for Solid State Physics, 22-1, 7-chome, Roppongi, Minato-ku, Tokyo, Japan.

This project attempts to improve physics education in colleges and high schools by emphasizing active participation of the students in the physics classroom. A Preliminary Survey Report, published in 1967, is available from project headquarters.

12. TOKYO UNIVERSITY STUDY GROUP ON ENGINEERING SCIENCE.

CONTACT: Prof. Takashi Mukaibo, Study Group on Engineering Science, Department of Industrial Chemistry, Faculty of Engineering, University of Tokyo, Hongo, Tokyo, Japan.

A group at the University of Tokyo including members from various science departments are developing a standard curriculum to be used in basic courses of engineering education for the second

and third years of college. The group has organized the publication, in Japanese, of textbooks covering all fields of the engineering sciences in 20 volumes; two of these have already been published by the Iwanami Publishing Company in Tokyo. A general description of the project (written in Japanese) is available from project headquarters.

13. NORTHERN NIGERIA TEACHER EDUCATION PROJECT.
CONTACT: Dr. Russell Owen, Chief of Party, NNTEP, P.O. Box 371, Kaduna, Nigeria, Tel. Kaduna 2418.

This project was begun to improve primary school instruction in Northern Nigeria by (a) experimenting with recent educational innovations; (b) producing improved instructional materials; (c) training "counterparts" and (d) supplying classroom teachers for the teachers colleges. University of Wisconsin teachers devote 70% of their time to teaching and 30% of their time for on-site development. The materials developed are to be disseminated into all 54 teacher's colleges in Northern Nigeria. The materials will be a series of lesson plans (approximately 80), designed as a self-contained teacher's source book. Publication of the first draft is scheduled for June 1968 with area-wide dissemination in 1969.

14. INTER-AMERICAN PROGRAM FOR THE IMPROVEMENT OF SCIENCE TEACHING--PROJECT 212.
CONTACT: Heitor G. de Souza, Inter-American Program for the Improvement of Science Teaching--Project 212, Unit of Science Development, Department of Scientific Affairs, Pan American Union, Washington, D.C. 20006.

The basic objectives of Project 212 are the improvement of the teaching of the sciences and mathematics in the Member Countries of the OAS within the framework of the Program of Technical Cooperation. To obtain these objectives the following activities are carried out: short intensive and advanced courses for university professors - 3 months duration - in the specialties of mathematics, physics, chemistry and biology; training courses for teachers of pedagogical institutes and science supervisors of the ministries of education - 3 months duration; short training and information seminars for the groups mentioned above (held in conjunction with short intensive and advanced courses mentioned above); the cooperation of the project with national courses that have the same objectives; study of present curriculum used in secondary schools and teachers' colleges; publication and translations of scientific monographs for the use of teachers; information services by means of a news bulletin. Information bulletins, available from headquarters, are published in Spanish.

15. EAST PAKISTAN EDUCATIONAL EQUIPMENT DEVELOPMENT BUREAU.
CONTACT: Dr. Md. Bazlul Haque, East Pakistan Educational Equipment Development Bureau, Dacca Polytechnic Institute Building, Tejgaon, Dacca-8, East Pakistan. Tel. 5-4598.

This project was begun in 1965 to reduce the importation of science equipment, to insure the availability of quality equipment and to

improve the quality of equipment usage. New designs in equipment are introduced, and equipment manufacturers are provided with advisory design and training services. The Bureau produces standard lists of equipment and apparatus with specifications in accordance with syllabi and curricula being used in the schools. Staff members advise teachers in the use and maintenance of equipment. A list of prototypes produced is available from project headquarters.

16. PROJECT FOR A MODERN TEACHING OF CHEMISTRY IN SECONDARY SCHOOLS.
CONTACT: Prof. F. Pinto-Coelho, Project for a Modern Teaching of Chemistry in Secondary Schools, The Chemical Laboratory, University of Coimbra, Coimbra, Portugal.

The Ministry of Education and OECD have organized this project to renew the chemistry curriculum and methods of chemistry teaching in the secondary schools of Portugal. The staff is presently continuing its study of similar projects from abroad and has begun preparation of materials. The revised notes will be used in a pilot program during the 1968-1969 academic year. A teachers' center, now being built, is scheduled for completion by the end of this year.

17. EXPERIMENT ON SYSTEMATIC TEACHING OF PROBABILITY.
CONTACT: Dr. E. Fischbein, Experiment on Systematic Teaching of Probability, Institute of Psychology, Str. Frumoasa 26, Bucharest, Rumania.

This project has carried on research on the development of the concept of probability in children. Results of their experiments have been published in L'Enfance (N.2, 1967, Paris). They are now beginning to write a curriculum to introduce fundamental probability notions to children 9 to 12 years old.

18. INDIVIDUALIZED MATHEMATICS INSTRUCTION.
CONTACT: Curt Oreberg, Individualized Mathematics Instruction, Lejens vag 4, Braas, Sweden. Tel. 0474/30458.

This project, supported by the National Board of Education, was initiated to meet the need for individualized instruction in mathematics in grades 7 through 9. Ten thousand students in sixty Swedish schools are using the materials. Contact project director for newsletters (some in English), reports, and a description of materials produced.

19. UNESCO SECONDARY SCIENCE TEACHING PROJECT.
CONTACT: S.A. Balezin, Professor and Chief Technical Advisor, UNESCO Secondary Science Teaching Project, National Institute of Education, N.C.E.R.T., Mehrauli Road, New Delhi 16, India.

This project, with headquarters in India, is one of the many world-wide efforts of UNESCO to improve science teaching at all levels of education. As this report is sent to press, the project director had not received authorization from UNESCO Headquarters to provide general information on their activities; therefore, we are unable to supply detailed descriptions of their efforts.

20. CIENCIAS, UNA INTRODUCCIÓN SISTEMÁTICA.

CONTACT: Prof. Julio C. Lagomarsino, Ciencias, Una Introducción Sistemática, Casilla 445, Montevideo, Uruguay.

Prof. Lagomarsino and his colleagues at the Instituto Magisterial Superior are planning the introduction of the course Science--A Process Approach, written by the AAAS, into some primary schools of Uruguay in March 1968. The program will begin in the first grade and gradually encompass all elementary grades. In-service training of teachers will continue during 1968 with a summer institute planned for January 1969.

21. INSTITUTE FOR THE TEACHING OF PHYSICAL SCIENCES.

CONTACT: Karl Hecht, Institute for the Teaching of Sciences, 23 Kiel Germany, Olshoussen Street 40-60, Building 34, New University Kiel, Federal Republic of Germany. Tel. 593-2545.

This research project is directed toward the fundamentals and principles of teaching physical sciences to children aged 8-13 years and 14-19 years old. Questions concerning the suitable age for physical science education to begin and the kind and amount of instruction to be offered are being investigated. Consideration of physical science content for the nonscientist student is also included.

The purpose of this project is to examine and improve the quality of physical science education by improving the teaching of it. There are no printed materials available at this date.

A. PROJECT TITLE: AAAS COMMISSION ON SCIENCE EDUCATION. The Commission has sponsored the development of a program in elementary school science known as Science--A Process Approach. This report is concerned with Science--A Process Approach, the Commission activity concerned with course content development.

B. PROJECT DIRECTOR: John R. Mayor, Director; Arthur H. Livermore, Deputy Director; 1515 Massachusetts Avenue, N.W.; Washington, D.C. Tel. 202-387-7171.

C. PROJECT HEADQUARTERS:
1. Contact: AAAS Commission on Science Education, Science--A Process Approach.
2. Special facilities or activities available for visitor viewing: The printed materials and kits of materials of Science--A Process Approach.

D. PRINCIPAL PROFESSIONAL STAFF: John R. Mayor, Director; Arthur H. Livermore, Deputy Director; Henry H. Walbesser, Jr., Assistant Director; Heather Carter, Joseph Dasbach, Diana Korhone, assistants.

E. PROJECT SUPPORT:
1. Organizational sponsorship: American Association for the Advancement of Science.
2. Funding agency: National Science Foundation.

F. PROJECT HISTORY:
1. Principal originators: Commission on Science Education of the American Association for the Advancement of Science.
2. Date and place of initiation: 1962; Washington, D.C.
3. Reason for initiation: In 1962 the Commission decided to sponsor the development of a program in science for elementary schools, including experimental laboratory experiences, focused primarily on ways to develop basic skills in the processes of science, specifying objectives of study performance, and designed to make possible particular achievements in the processes of science which can be related to individual development in knowledge of science and its methods.

G. PRESENT COMMERCIAL AFFILIATIONS: Xerox Corporation, 600 Madison Avenue, New York, New York 10022.

H. PURPOSES AND OBJECTIVES: Science--A Process Approach is designed to present instruction which is intellectually stimulating and scientifically authentic. It is based on a belief that the scientific approach to gaining knowledge of man's world has a fundamental importance in the general education of every child. Instructional materials of Science--A Process Approach are prepared for the teacher, while kits of materials are available for use by the children. Topics covered sample widely from the various fields of science, including some exercises in mathematics and the social sciences. The exercises are ordered in a sequence of

instruction to provide a developmental progression of increasing competence in the processes of science. Each exercise is designed to achieve clearly stated objectives. Methods for evaluating the pupil achievement and progress are an integral part of the program. A guide for in-service instruction is also provided. (These descriptive phrases are taken from a recently published brochure, Science--A Process Approach: Purposes, Accomplishments, Expectations. Copies of the brochure are available upon request.)

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study, discussion groups.

J. ORIENTATIONS OF STATED OBJECTIVES: Process acquisition, scientific literacy, behavioral changes.

K. LOCATION OF LIST OF OBJECTIVES: Behavioral objectives are stated for each exercise. The program is organized in seven parts and in each part are 20 to 26 exercises.

L. SPECIFIC SUBJECTS, GRADE AND AGE LEVELS: Science for kindergarten through grade 6.

M. DESCRIPTION OF MATERIALS ALREADY PRODUCED:
Distributed by Xerox Education Division, New York, New York 10022:
1. Science--A Process Approach, A-E, grades K-4.
2. Kits of Teaching Aids for Science--A Process Approach, all parts.
3. Process Hierarchy Chart for Science--A Process Approach, parts A-D.

Available from the Commission on Science Education, American Association for the Advancement of Science, Washington, D.C.:
4. Science--A Process Approach, parts 6 and 7, Fourth Experimental Edition.
5. Science--A Process Approach, Competency Measures, parts 4&5.
6. Science--A Process Approach, Commentary for Teachers.
7. Science--A Process Approach, Guide for Inservice Instruction.
8. Science--A Process Approach, Response Sheets for the Guide.
9. The Psychological Bases of Science--A Process Approach, 2nd Edition, 1967.
10. An Evaluation Model and Its Application, 2nd Edition, 1967.
11. Newsletter, AAAS Commission on Science Education.

N. MATERIALS AVAILABLE FREE: Items 9, 10, and 11.

O. MATERIALS PURCHASABLE: Items 1, 2, and 3 contact Xerox for prices. Contact American Association for the Advancement of Science, 1515 Massachusetts Avenue, N.W., Washington, D.C. 20005 for the following: Item 4, Part 6 - $4.35; Part 7 - $3.50. Item 5, Competency Measures - $1.00 (Part 4); Competency Measures - $3.50 (Part 5). Item 7, Guide for Inservice Instruction - $2.30. Item 8, Response Sheets for Guide - $1.00.

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7. Science--A Process Approach, Guide for Inservice Instruction.
8. Science--A Process Approach, Response Sheets for the Guide.
9. The Psychological Bases of Science--A Process Approach, 2nd Edition, 1967.
10. An Evaluation Model and Its Application, 2nd Edition, 1967.
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P. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

Q. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: Spanish for use in the schools of Puerto Rico.

R. PROJECT IMPLEMENTATION:

1. Number of teachers using materials: In 1967-68, probably more than 25,000.
2. Number of students involved: Probably more than 750,000.
3. Number of schools involved: Not known.
4. Sources of totals in 1, 2, and 3 above: The above figures are based on sales of experimental and AAAS-Xerox editions.
5. Name and location of specific schools where course is being taught: 1967-68 tryout centers include Seattle, Tucson, Austin, Tallahassee, Baltimore, Philadelphia, Lakewood (Ohio), Overland Park (Kansas), The University of Chicago Laboratory Schools, Oshkosh, Monmouth (Illinois). The program is also being taught in many other school systems.
6. Availability of consultants for teachers: A list of recommended consultants is available. These consultants in general expect travel expenses and a stipend. Some consultants are also provided by the Xerox Corporation.
7. Activities conducted for in-service teacher training: A Guide for Inservice Instruction is available to instructors of inservice classes.
8. Implementation procedures in addition to above: Several universities have sponsored inservice programs or summer conferences, with the cooperation of the Commission. Science educators, supervisors, and administrators who have participated in these programs serve as leaders of inservice programs in their own schools and in other localities.
9. Implementation procedure, seemingly, the most effective: In-service classes based on the Guide for Inservice Instruction have proved to be quite effective.
10. How evaluated: The Guide includes a teacher process test in two forms that can be administered as a pre-test and post-test. Teacher feedback forms on in-service sessions have been used in evaluation of the exercises in the Guide.

S. PROJECT EVALUATION:

1. Evaluation conducted by: The evaluation is conducted by the Commission staff under the direction of Dr. Walbesser.
2. Instruments used: Competency measures for each exercise and a Science Process Instrument to be administered at the end of each year.
3. Control groups: The Science Process Instrument has been administered to control groups chosen by cooperating schools.
4. Feedback process: In the tryout, the teacher submits a feedback form and competency measure results for each exercise taught.
5. Research evidence of objectives achieved: Research evidence is comprised of data from administration of competency measures and the Science Process Instrument.

6. Availability of evidence: Research evidence is available to curriculum coordinators, supervisors and principals in the second edition of the evaluation monograph. Research evidence has also been reported in the Newsletter.

T. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: A six-week writing session in which 24 scientists and teachers participated was held at the University of Maryland in the summer of 1967 to revise Parts Six and Seven, the evaluation instruments, and prepare copy for the first edition of the Guide for Inservice Instruction. The Guide and the Fourth Experimental Edition of Parts Six and Seven were published in the fall. Copy for the second edition of the evaluation monograph has been prepared for publication in March 1968. The Xerox Corporation has prepared kits for all Parts of Science--A Process Approach.

U. PLANS FOR THE FUTURE: Parts D and E of Science--A Process Approach and the Commentary for Teachers will be published by the Xerox Corporation in the spring of 1968. Parts F and G will be published in the spring of 1969. Additional development work is scheduled for the in-service program and evaluation instruments.

A. PROJECT TITLE: ADVANCED GENERAL MATHEMATICS CURRICULUM MATERIALS PROPOSAL (MATH III).

B. PROJECT DIRECTOR: J. Ben Cox, Director of Federal Projects, Richland County School District Number One, 1616 Richland St., Columbia, S.C. 29201. Tel. 803-765-2491.

C. PROJECT HEADQUARTERS:
1. Contact: William B. Hynds, Assistant Supervisor for Mathematics, Math III, S.C. State Dept. of Education, 801-B Rutledge Building, Columbia, S.C. 29201.
2. Special facilities or activities available for visitor viewing: Classroom use of prepared materials in five area high schools.

D. PRINCIPAL PROFESSIONAL STAFF: Writing team: Mabel Rutledge, Abbie Kneece, Gladys Pushard, Mary Williams, Rubie Schumpert, Martha Ray Sullivan, Margery Short, O. Lexton Buchanan; Audio Visual Specialist: Hubbard S. Buchanan, Richard Predmore; Project Consultant: Cornelia Turnbull; Project Coordinator: William B. Hynds; Project Director: J. Ben Cox.

E. PROJECT SUPPORT:
1. Organizational sponsorship: Columbia Public Schools (Richland County School District Number One).
2. Funding agency: Title III, ESEA, U.S. Office of Education.

F. PROJECT HISTORY:
1. Principal originators: Assistant State Supervisor for Mathematics and Administrative staff of Columbia Public Schools.
2. Date and place of initiation: June 17, 1967; Columbia, S.C.
3. Reason for initiation: To improve, enliven, and enlarge the secondary mathematics program for non-college bound students with average to low-average abilities.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PURPOSES AND OBJECTIVES: To develop effective materials for a third and fourth (see Section U) year program for students who, immediately after high school, will seek employment in business and industry or will seek additional vocational or technical training. Materials prepared for Math III are non-textbook oriented, utilize inductive learning, and stress daily student participation in concept development. Unique characteristics -- this project proposes to ultimately develop a four-year General Mathematics program commensurate with student needs and abilities rather than simply improving the traditional two-year program. Topics for Math III were determined by results of survey of business and industry.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Laboratory investigations, discovery approach.

J. ORIENTATIONS OF STATED OBJECTIVES: Content mastery; attitudinal changes.

K. LOCATION OF LIST OF OBJECTIVES: Page 3 of project proposals.

L. SPECIFIC SUBJECTS, GRADE AND AGE LEVELS: General Math III and IV, grades 11, 12, topics to include slide rule, ratios, geometry, trigonometry, probability, and extensive application of these.

M. DESCRIPTION OF MATERIALS ALREADY PRODUCED: Materials prepared for a Math III class include:
1. One hundred fifty (150) lesson outlines for teacher use.
2. Student worksheets.
3. Answers to worksheet problems for teacher use.
4. One hundred fifteen (115) transparencies for use with lesson outlines.

N. MATERIALS AVAILABLE FREE: None.

O. MATERIALS PURCHASABLE: Not yet available.

P. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

Q. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: None planned.

R. PROJECT IMPLEMENTATION:
1. Number of teachers using materials: 5.
2. Number of students involved: 135 (6 classes).
3. Number of schools involved: 5.
4. Sources of totals in 1, 2, and 3 above: Efforts were made to select schools which differed in size, location (urban, suburban, rural) and cultural background of student body.
5. Name and location of specific schools where course is being taught: Eau Claire High School, C.A. Johnson High School, Lower Richland High School, Dreher High School, and Olympia High School. (All in Richland School District Number One.)
6. Availability of consultants for teachers: Periodic visits to pilot schools to answer questions relative to use of materials and to discuss possible material improvement.
7. Activities conducted for in-service teacher training: One week workshop for pilot teachers to familiarize them with objectives of program and use of materials.

S. PROJECT EVALUATION:
1. Evaluation conducted by: Project coordinator, project consultant, and pilot teachers.
2. Instruments used: Metropolitan High School Mathematics Test, Part A and Part B, Survey of Arithmetic Achievement - Advanced, California Test Bureau.
3. Control groups: Random sample of 11th grade non-college bound not in Math III program; random sample of 11th grade college bound students.
4. Feedback process: Scores from three groups will be investigated for significant differences.
5. Research evidence of objectives achieved: None.

T. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: (Not previously reported).

U. PLANS FOR THE FUTURE:

1. Summer 1968 - Preparation of materials for Math IV and refinement of Math III materials.
2. Academic year 1968-69. Piloting of refined Math III material and new Math IV materials.
3. Hopefully this program will be expanded and used experimentally in an 8 county region, and if successful, will be adopted state-wide.

A. PROJECT TITLE: ANTHROPOLOGY CURRICULUM STUDY PROJECT (ACSP).

B. PROJECT DIRECTOR: Dr. Malcolm Collier, 5632 South Kimbark Avenue, Chicago, Illinois 60637. Tel. 312-493-4620.

C. PROJECT HEADQUARTERS:
1. Contact: Dr. Malcolm Collier, ACSP.
2. Special facilities or activities available for visitor viewing: (Not answered).

D. PRINCIPAL PROFESSIONAL STAFF: Robert G. Hanvey, Curriculum Research Director; Alex Weingrod, Research Director; Edwin S. Dethlefsen, Unit Director; Frederick Gearing, Assistant Director; Kurt W. Johnson, Assistant Director.

E. PROJECT SUPPORT:
1. Organizational sponsorship: American Anthropological Association.
2. Funding agency: National Science Foundation.

F. PROJECT HISTORY:
1. Principal originator: American Anthropological Association.
2. Date and place of initiation: March 1962; Chicago, Illinois.
3. Reason for initiation: Expressed interest in anthropology in high school.

G. PRESENT COMMERCIAL AFFILIATIONS: The Macmillan Company.

H. PURPOSES AND OBJECTIVES: It is the only federally supported secondary anthropology program; the staff attempts to bring the conventional social studies curriculum in line with modern social science by introducing some of the information on and processes of observation and analysis of human history and human behavior characteristic of anthropology.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study; discussion groups; inference from data, e.g., site maps, evidence cards, casts.

J. ORIENTATIONS OF STATED OBJECTIVES: Process acquisition; attitudinal changes; understanding and appreciation of the methods and substance of anthropology, and the application of these to other social sciences.

K. LOCATION OF LIST OF OBJECTIVES: In the teaching plans and the unit outlines.

L. SPECIFIC SUBJECTS, GRADE AND AGE LEVELS: Study of human history, process of culture change; for use in world history and world cultures courses at 9th and 10th grade levels.

M. DESCRIPTION OF MATERIALS ALREADY PRODUCED:
1. Fact Sheet.
2. Newsletter #6.
3. "Anthropology in the Schools" by Robert Hanvey.
4. "Two Dozen Anthropology Books" by Kurt Johnson.
5. Unit information sheet "Patterns in Human History".

6. Unit information sheet "Studying Societies: The Kwakiutl as a Model".
7. The Study of Early Man teaching plan and student materials. (Now being revised for incorporation in commercial publication: Patterns in Human History: An Anthropological Perspective).
8. The Great Transformation teaching plan and student materials (now being revised for incorporation in commercial publication: Patterns in Human History: An Anthropological Perspective).
9. Day One "Anthropological Materials in Social Studies Courses: A Case Study".
10. "Day One" 20 min. film from The Study of Early Man.
11. "Inference from Archeological Evidence" 20 min. film from The Great Transformation.
12. The Great Tree and the Longhouse: Culture of the Iroquois by Hazel Hertzberg; teachers manual by Hazel Hertzberg.
13. Kiowa Years: Study in Culture Impact and Profile of a People by Alice Marriott, teachers manual by Rachel Reese Sady.
14. An Annotated Bibliography of Anthropological Materials for High School Use by James J. Gallagher.
15. Film information sheet for "Day One".
16. Film information sheet for "Inference from Archeological Evidence".

N. MATERIALS AVAILABLE FREE: Items 1 through 6, 15 and 16 are free on request from ACSP office: 5632 South Kimbark Avenue, Chicago, Illinois 60637.

O. MATERIALS PURCHASABLE: Items 7 and 8 may be purchased for $5.00 each from ACSP office: available only to curriculum laboratories, social studies methods courses, and state departments of education. Loan sets available to others. Item 9 may be purchased for $1.00 a single copy, 80¢ each for 10 or more copies, from ACSP office. Items 10 and 11 may be rented for 1-2 days for $5 plus return postage and insurance, for one week for $10 plus return postage and insurance, from ACSP office. Items 12, 13, and 14 are available from The Macmillan Company, 866 Third Avenue, New York, New York 10022. Item 12 is $2.40, 13 and 14 are $2.44 each.

P. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

Q. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: (Not answered).

R. PROJECT IMPLEMENTATION:
1. Number of teachers using materials: Testing Study of Early Man and Great Transformation: 95; Testing Studying Societies: 11.
2. Number of students involved: Testing Study of Early Man and Great Transformation: 8,500; Testing Studying Societies: 500.
3. Number of schools involved: Testing Study of Early Man and

Great Transformation: 49; Testing Studying Societies: 8.
4. Sources of totals in 1, 2, and 3 above: The testing situation was closely controlled, and the staff had correspondence with all schools and teachers.
5. Name and location of specific schools where course is being taught: Neither course is commercially available as yet, so the final courses are not yet being taught at any school, though several of the participating schools in last year's experimental trial are using the materials from that trial on their own this year: Verde Valley School, Sedona, Arizona; Arvada High School, Arvada, Colorado; Ygnacio Valley HS, Concord, Calif.; Oakland HS, Oakland, Calif.; Riverside HS, Riverside, Calif.; Crawford HS, San Diego, Calif.; Madison HS, San Diego, Calif.; Sir Francis Drake HS, San Anselmo, Calif.; Dover Sr. HS, Dover, Delaware; Calumet HS, Chicago, Illinois; University HS, Bloomington, Indiana; Arlington HS, Indianapolis, Indiana; Hazelwood Jr HS, New Albany, Indiana; Dupont Manual HS, Louisville, Kentucky; Pikesville Sr HS, Baltimore, Maryland; Newton HS, Newtonville, Mass.; Munger Jr. HS, Detroit, Michigan; Kennedy HS, Bloomington, Minn. Also schools in: St. Paul, Minn.; St. Louis, Missouri; Hanover, New Hampshire; Oyster Bay, New York; Philadelphia, Pa.; Seattle, Washington; Portland, Oregon.
6. Availability of consultants for teachers: Teacher services and support programs are now being initiated to provide guidance and reassurance in regard to change and feasibility of teacher competence in this area and with these materials.
7. Activities conducted for in-service teacher training: The experimental teachers' final year of using the materials with a very detailed teaching plan was the most effective teacher-training experience.

S. PROJECT EVALUATION:
1. Evaluation conducted by: ACSP staff (see Day One "A Case Study" for details).
2. Instruments used: Pre- and post-tests of students, interviews with teachers and students, visiting of classes in progress.
3. Control groups: (Not answered).
4. Feedback process: (Not answered).
5. Research evidence of objectives achieved: (Not answered).

T. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: Revision of Studying Societies for final testing; revision of Study of Early Man and Great Transformation for commercial publication as Patterns in Human History; commercial availability of The Great Tree and the Longhouse, Kiowa Years, An Annotated Bibliography.

U. PLANS FOR THE FUTURE: Expansion of teacher support and curriculum implementation activities.

A. PROJECT TITLE: APPLICATION OF MATHEMATICAL LEARNING THEORY TO SECOND-LANGUAGE ACQUISITION WITH PARTICULAR REFERENCE TO RUSSIAN.

B. PROJECT DIRECTORS: Prof Patrick Suppes and Prof. Joseph Van Campen, Institute for Mathematical Studies in the Social Sciences, Ventura Hall, Stanford University, Stanford, California 94305. Tel. DA1-2300.

C. PROJECT HEADQUARTERS:
1. Contact: Prof. Joseph Van Campen, Application of Mathematical Learning Theory to Second-Language Acquisition with Particular Reference to Russian.
2. Special facilities or activities available for visitor viewing: Tour of classroom and laboratory.

D. PRINCIPAL PROFESSIONAL STAFF: Professor Joseph Van Campen, Project Director.

E. PROJECT SUPPORT:
1. Organizational sponsorships: Stanford University and the Ravenswood City School District.
2. Funding agency: U.S. Office of Education.

F. PROJECT HISTORY:
1. Principal originators: Patrick Suppes, Joseph Van Campen, and Mrs. Elise Belenky.
2. Date and place of initiation: Summer 1967; Stanford University.
3. Reason for initiation: To investigate using computer-assisted instruction to provide a self-teaching program in elementary Russian at the university level.

G. PRESENT COMMERCIAL AFFILIATIONS: No direct commercial affiliations. Equipment being used has been purchased or leased from IBM, Philco, Westinghouse, and Digital Equipment Corporation.

H. PURPOSES AND OBJECTIVES: To apply learning theory to problems of second-language acquisition with particular reference to Russian. The objective of the laboratory has been to develop a computer based first year Russian course at the university level which consists of lessons taken at the terminals and language-laboratory tapes and accompanying drill sheets. The tapes provide material for pronunciation practice and test students' ability to comprehend spoken Russian.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study; programmed instruction; computer assisted instruction; classroom instruction.

J. ORIENTATIONS OF STATED OBJECTIVES: Content mastery; process acquisition.

K. LOCATION OF LIST OF OBJECTIVES: (Not answered).

L. SPECIFIC SUBJECTS, GRADE AND AGE LEVELS: Elementary Russian language course, university level.

M. DESCRIPTION OF MATERIALS ALREADY PRODUCED: A large body of

curriculum material encoded for use in computer systems. (Not available for distribution).

N. MATERIALS AVAILABLE FREE:

1. Atkinson, R.C. Those computers in Palo Alto. The Reading Newsreport 1967, 2, 14-23.
2. Atkinson, R.C., & Wilson, H.A. Computer-based instruction in initial reading: A progress report on the Stanford project. Technical Report 119, August 25, 1967, Psychology Series, Institute for Mathematical Studies in the Social Sciences, Stanford University.
3. Atkinson, R.C. Computerized instruction and the learning process. Technical Report No. 122, September 15, 1967, Psychology Series, Institute for Mathematical Studies in the Social Sciences, Stanford University.
4. Atkinson, R.C. The computer is a tutor. Psychology Today, January 1968, pages 36-39, 57-60.
5. Atkinson, R.C., & Hansen, D.N. Computer-assisted instruction in initial reading: The Stanford project. Reading Research Quarterly, 1966, 2, 5-25.

O. MATERIALS PURCHASABLE: None.

P. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: Russian and English.

Q. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: None.

R. PROJECT IMPLEMENTATION:

1. Number of teachers using materials: None.
2. Number of students involved: 28.
3. Number of schools involved: One.
4. Sources of totals in 1, 2, and 3 above: Institute records.
5. Name and location of specific schools where course is being taught: Stanford University.
6. Availability of consultants for teachers: Not available.
7. Activities conducted for in-service teacher training: None.
8. Implementation procedures in addition to above: (Not answered).
9. Implementation procedure, seemingly, the most effective: (Not answered).
10. How evaluated: (Not answered).

S. PROJECT EVALUATION:

1. Evaluation conducted by: Staff of the IMSSS.
2. Instruments used: Examinations.
3. Control groups: Used, chosen randomly.
4. Feedback process: (Not answered).
5. Research evidence of objectives achieved: Examination scores.
6. Availability of evidence: Available through mail.

T. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: (Not answered).

U. PLANS FOR THE FUTURE: (Not answered).

A. PROJECT TITLE: THE AVAILABILITY OF SUPPLEMENTAL EDUCATIONAL RESOURCES THROUGH THE USE OF A PLANETARIUM.

B. PROJECT DIRECTOR: Don L. Bean, Supervisor, W.J. Arrasmith Planetarium, 2124 No. Lafayette, Grand Island, Nebraska 68801. Tel. 308-384-1430.

C. PROJECT HEADQUARTERS:

1. Contact: Mr. Don L. Bean, Supervisor, The Availability of Supplemental Educational Resources Through the Use of a Planetarium, Grand Island Senior High School, 2124 No. Lafayette, Grand Island, Nebraska 68801.
2. Address: Dr. Glenn A. Lundstrom, Superintendent, 615 North Elm Street, Grand Island, Nebraska 68801. Tel. 308-382-3191.
3. Special facilities or activities available for visitor viewing: Planetarium chamber program, modified projection facilities, video recorder operation.

D. PRINCIPAL PROFESSIONAL STAFF: Mr. Lon L. Bean, Supervisor.

E. PROJECT SUPPORT:

1. Organizational sponsorship: Dr. Glenn A. Lundstrom.
2. Funding agencies: ESEA Title III Grand; School District 2 of Grand Island, Nebraska.

F. PROJECT HISTORY:

1. Principal originator: Dr. Glenn A. Lundstrom.
2. Date and place of initiation: November 1965; (place not specified).
3. Reason for initiation: To upgrade space science education in the Central Nebraska region.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PURPOSES AND OBJECTIVES: The purpose of this project is to create exemplary space age instruction through:

1. The development of a space science curriculum.
2. Development of in-service training experiences for teachers.
3. Development of suitable teaching guides and instructional media materials.
4. The development of sequential and non-sequential programming for all residents of the area.

The Grand Island Public Schools would become a servicing agency for students and adults of both private and public schools in this area. The provision of an exemplary space audio-visual center has been proposed to augment the facility. This audio-visual center will provide materials not now available for teachers, and the production or duplication of materials to enable the classroom teachers to present space age curriculum to their students with greater depth.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Laboratory investigations; lectures.

J. ORIENTATIONS OF STATED OBJECTIVES: Regional service, individual classroom oriented supplement.

K. LOCATION OF LIST OF OBJECTIVES: Project Proposal.

L. SPECIFIC SUBJECTS, GRADE AND AGE LEVELS: Astronomy and Space Science, K-12, adult education.

M. DESCRIPTION OF MATERIALS ALREADY PRODUCED:
1. Brochure--Planetarium use and availability.
2. Program supplements--grades 3, 4, 5, 6, hand out reinforcing materials--secondary teaching aids.
3. Transparencies--instructional supplements, declination diagram, configuration diagram.
4. Audio-visual catalog--slides, films, filmstrip reference catalog.
5. Grade 11-12 course outline--description of 1 semester course.
6. Constellation synopsis--brief sketch relating star pattern to mythology.
7. Astrology sketch--the Zodiac signs.

N. MATERIALS AVAILABLE FREE: All those listed in Section M from project director.

O. MATERIALS PURCHASABLE: None.

P. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

Q. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: None.

R. PROJECT IMPLEMENTATION:
1. Number of teachers using materials: 465.
2. Number of students involved: 5,000.
3. Number of schools involved: 140.
4. Sources of totals in 1, 2, and 3 above: Derived by a calculation of schools that have been given curriculum material. The availability is guaranteed; the use is assumed.
5. Name and location of specific schools where course is being taught: The curriculum material being developed will be used in an 8 county area involving an excess of 140 county schools.
6. Availability of consultants for teachers: Available. The planetarium supervisor is available for in-service education, consultation, hand-out materials, program supplement, planetarium program, synopsis of specific areas, and curriculum and teacher guides when prepared.
7. Activities conducted for in-service teacher training: Individual or group orientation on the capabilities or limitations of the planetarium as an audio visual supplement to the classroom preparation. Possible short class in astronomy and space science to selected teachers.
8. Implementation procedures in addition to above: For general public availability: dissemination of information for use provided through cooperation with agricultural agents, scout office, and chambers of commerce.
9. Implementation procedure, seemingly, the most effective: (1) Direct contact with schools; (2) Local Chamber of Commerce contact; (3) Scout office contact.

10. How evaluated: (1) Response--scheduling; (2) personal contact.

S. PROJECT EVALUATION:

1. Evaluation conducted by: Initial compilation of data by project director.
2. Instruments used: To be developed.
3. Control groups: None used.
4. Feedback process: Teacher contact on planetarium programming and supplemental material, correspondence in reference to procedure practices or material, judgment of interest by such indicators as library traffic in astronomy space related areas.
5. Research evidence of objectives achieved: Those that have used the material have proved positive evaluation.
6. Availability of evidence: Available; correspondence.
7. Other pertinent information: Specific means to be determined by communication and consultation.

T. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: (1) Acquisition and installation of equipment; (2) completion of staff; (3) development of supplemental teacher material; (4) purchase of audio visual materials; (5) cataloging of audio visual material; (6) collection of curriculum material from other sources; (7) dissemination of information to school and community; (8) development of secondary curriculum material.

U. PLANS FOR THE FUTURE: Development of elementary curriculum material; completion of curriculum and teacher guides; publication of guides and distribution of material to the region.

A. PROJECT TITLE: BIOLOGICAL SCIENCES CURRICULUM STUDY (BSCS).

B. PROJECT DIRECTOR: Dr. William V. Mayer, Director, BSCS, University of Colorado, P.O. Box 930, Boulder, Colorado 80302. Tel. 303-443-2211, Ext. 6453.

C. PROJECT HEADQUARTERS:
1. Contact: Dr. William V. Mayer, Director, BSCS, or Dr. Jack L. Carter, Associate Director, BSCS.
2. Special facilities or activities available for visitor viewing: The materials produced; BSCS Single Topic Films; the information film, "The Story of BSCS"; BSCS Newsletter.

D. PRINCIPAL PROFESSIONAL STAFF: William V. Mayer, Director; Jack L. Carter, Associate Director; George M. Clark, Assistant Director; Keith L. Bumsted, Business Manager; Glen E. Peterson, Consultant; Manert Kennedy, Consultant; Jane Larson, Director Art Dept.; Richard Boolootian, Consultant.

E. PROJECT SUPPORT:
1. Organizational sponsorship: AIBS, 1959-63 - University of Colorado 1963 to present.
2. Funding agencies: NSF, NSF/AID, Asia Foundation, Rockefeller Foundation.

F. PROJECT HISTORY:
1. Principal originators: American Institute of Biological Sciences (AIBS).
2. Date and place of initiation: 1959; Boulder, Colorado.
3. Reason for initiation: To contribute to the improvement of biological education through the preparation of curriculum materials related to the study of biology.

G. PRESENT COMMERCIAL AFFILIATIONS: Several firms publish different parts of materials. For complete listing, write to Project Director for list published in August, 1967.

H. PURPOSES AND OBJECTIVES: To contribute to the improvement of biological education through preparation of curriculum materials related to the study of biology. Three versions of BSCS biology have been produced and have now been revised; an international program involves many scientists overseas in processes of adaptations of the three versions and other BSCS materials in various languages.

I. METHODS OF INSTRUCTIONS USED IN THE PROJECT: Independent study, programmed instruction, laboratory investigations, discussion groups, "Invitations to Inquiry" and Single Topic Films.

J. ORIENTATIONS OF STATED OBJECTIVES: Process acquisition, attitudinal changes, scientific literacy, career guidance, self-directiveness.

K. LOCATION OF LIST OF OBJECTIVES: Teacher's guides and handbooks.

L. SPECIFIC SUBJECTS, GRADE AND AGE LEVELS: First course in secondary school biology (10th grade) ages 15, 16; Second course in secondary school biology (12th grade) ages 17, 18;

special materials for low-ability high school students.

M. DESCRIPTION OF MATERIALS ALREADY PRODUCED:

1. Blue Version - Biological Science: Molecules to Man; Houghton Mifflin Company, 110 Tremont St., Boston, Mass. 02107.
2. Green Version - High School Biology, BSCS Green Version; Rand McNally & Co., P.O. Box 7600, Chicago, Illinois 60680.
3. Yellow Version - Biological Science: An Inquiry Into Life; Harcourt, Brace & World, Inc., 757 Third Avenue, New York 10017.
4. Version Tests - Quarterly Achievement Tests in two alternate forms and Processes of Science Test (POST): for all versions: The Psychological Corp., 304 E. 45th Street, N.Y., N.Y. 10017.
5. Second Course - Biological Science: Interaction of Experiments and Ideas; Prentice-Hall, Inc., Englewood Cliffs, N.J. 07632.
6. Second Course Tests - Quarterly Tests and Final Examination; Prentice-Hall, Inc., Englewood Cliffs, New Jersey 07632.
7. Special Materials - Biological Science: Patterns and Processes; Holt, Rinehart and Winston, Inc., 383 Madison Ave., New York, N.Y. 10017.
8. Special Materials Tests - Unit Tests and Final Examination; The Psychological Corporation, 304 E. 45th St., New York, N.Y. 10017.
9. Laboratory Blocks - Plant Growth and Development; Animal Growth and Development; Microbes: Their Growth, Nutrition and Interaction; The Complementarity of Structure and Function; Field Ecology; Regulation in Plants by Hormones--A Study in Experimental Design; Animal Behavior; Life in the Soil; Genetic Continuity; D.C. Heath & Co., 285 Columbus Ave., Boston, Mass. 02116. Innovations in Equipment and Techniques for the Biology Teaching Laboratory; D.C. Heath & Co., 285 Columbus Ave., Boston, Mass. 02116.
10. Teachers' Handbook - Biology Teachers' Handbook; John Wiley & Sons, Inc., 605 Third Ave., New York, N.Y. 10016.
11. Biological Investigations for Secondary School Students - Research Problems in Biology: Investigations for Students, Series One, Two, Three, and Four; Doubleday & Co., 277 Park Avenue, New York, N.Y. 10017.
12. Pamphlet Series (24 titles); D.C. Heath & Co., 285 Columbus Avenue, Boston, Mass. 02116.
13. Techniques Films (16 mm sound or 8 mm loop, silent); Thorne Films, 1229 University Ave., Boulder, Colo. 80302.
14. BSCS Newsletter.
15. BSCS Special Publication No. 3, BSCS Materials for Preparation of In-Service Teachers of Biology.
16. BSCS Special Publication No. 4, The Teacher and BSCS Special Materials.
17. BSCS Special Publication No. 5, Laboratory Blocks in Teaching Biology.
18. BSCS Bulletin No. 1: Biological Education In American Secondary Schools 1890-1960, by Paul DeH. Hurd, 1961.
19. BSCS Bulletin No. 2: Teaching High School Biology: A Guide to Working With Potential Biologists, by Paul Brandwein,

Jerome Metzner, Evelyn Morholt, Anne Roe, and Walter Rosen, 1963.
20. BSCS Bulletin No. 3: BSCS Biology - Implementation in the Schools, by Arnold Grobman, Paul DeH. Hurd, Paul Klinge, Margaret McKibben Lawler, and Elra Palmer, 1964.
21. Laboratory Blocks, experimental editions.
22. The Molecular Basis of Metabolism.
23. Physiological Adaptation.
24. Information Film, The Story of BSCS.

N. MATERIALS AVAILABLE FREE: Items 14, 15, 16, 17, and 24.

O. MATERIALS PURCHASABLE: Item 18, $3.50; Item 19, $2.00; Item 20, $3.50; Item 22, $1.25; Item 23, $1.25; Other prices may be obtained from the publisher.

P. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

Q. LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: Spanish, Portuguese, Italian, French, Chinese, Japanese, Russian, Hebrew, Turkish, Thai.

R. PROJECT IMPLEMENTATION:
1. Number of teachers using materials: 15,000 to 20,000 (estimated).
2. Number of students involved: 1,500,000 (estimated).
3. Number of schools involved: 50% of schools in the United States (estimated).
4. Sources of totals in 1, 2, and 3 above: From book sales.
5. Name and location of specific schools where course is being taught: Baltimore, Houston, Denver, Detroit, Chicago, and Los Angeles School Systems, etc.
6. Availability of consultants for teachers: Area consultants listed in Newsletter.
7. Activities conducted for in-service teacher training: College-School Cooperative programs; Cooperation with Summer and Academic-Year Institute programs.
8. Implementation procedures in addition to above: Newsletters, Special Publication series, exhibits at National Conventions, specific training programs, information services, lectures, and panel participation.
9. Implementation procedure, seemingly, the most effective: Specific training programs.
10. How evaluated: Direct observation and follow-up.

S. PROJECT EVALUATION:
1. Evaluation conducted by: BSCS headquarters staff.
2. Instruments used: Various testing instruments developed by BSCS.
3. Control groups: Earlier in evaluation program control groups were used. Now difficult to use because of contamination.
4. Feedback process: Direct communication; direct observation; area consultant reports; tape recordings; specific research projects.

5. Research evidence of objectives achieved: Reported in Newsletters.
6. Availability of evidence: Reported in Newsletters.

T. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: Special Publication #5; versions revised; teachers guides revised; films tested and completed, ready for distribution.

U. PLANS FOR THE FUTURE: Revision of the information film, "The Story of BSCS"; production of a teacher preparation film; developed a proposal for establishing guidelines for development of modern instructional program in life sciences as a one-year course for intermediate grades (7th & 8th). Special materials program at 50 briefing sessions for 1,500 teachers. Expanded cooperative college-school Los Angeles. International cooperation involving UNESCO project in Africa and over 30 countries.

A. PROJECT TITLE: BOSTON COLLEGE MATHEMATIC INSTITUTE (BCMI).

B. PROJECT DIRECTOR: Stanley J. Bezuszka, S.J., BCMI, Boston College, Chestnut Hill, Massachusetts 02167, Tel. 617-332-3200.

C. PROJECT HEADQUARTERS:
1. Contact: Project Director, BCMI.
2. Special facilities or activities available for visitor viewing: Visitor is welcome to visit institute classes; inspect experimental drill machines for classrooms; discuss project activities with staff members.

D. PRINCIPAL PROFESSIONAL STAFF: Stanley J. Bezuszka, S.J.; Albert A. Bennett, Consultant; Mary E. Farrey and Margaret J. Kenney, Staff Assistants; Francis Torras, S.J., Consultant.

E. PROJECT SUPPORT:
1. Organizational sponsorship: Boston College.
2. Funding agency: National Science Foundation.

F. PROJECT HISTORY:
1. Principal originator: Stanley J. Bezuszka, S.J.
2. Date and place of initiation: June 1957; Boston College, Chestnut Hill, Massachusetts.
3. Reason for initiation: To direct the education and re-education of teachers of mathematics in content, theory and terminology of contemporary mathematics.

G. PRESENT COMMERCIAL AFFILIATIONS: The director and one of the Staff Assistants are affiliated with the publishing house William H. Sadlier, Inc., New York as author and/or consultant in a text book series.

H. PURPOSES AND OBJECTIVES: The maȯjr objective of the institute program is to offer courses and prepare instructional materials for teachers of mathematics. A distinguishing characteristic of the philosophy of this program is the emphasis on the structural approach to mathematics in combination with stress on the historical aspects of the subject.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study; lectures; seminars; discussion groups; computer assisted instruction.

J. ORIENTATIONS OF STATED OBJECTIVES: Content mastery; process acquisition; attitudinal changes; scientific literacy; career guidance.

K. LOCATION OF LIST OF OBJECTIVES: The objectives are listed in the reports published by the institute.

L. SPECIFIC SUBJECTS, GRADE AND AGE LEVELS: The institute program encompasses grade 7 through college sophomore directly, and the elementary grades to a certain extent, through consultation services. Emphasis is currently on the preparation of computer oriented mathematics texts, correspondence courses for teachers, and a calculus text for secondary school students.

M. DESCRIPTION OF MATERIALS ALREADY PRODUCED:

Title	Unit Cost	Postage/Handling
1. Contemporary Progress in Mathematics, Parts 1 and 2	$2.50	$ .25
2. Contemporary Progress in Mathematics, Parts 1 and 2 Teacher Manual	1.25	.25
3. Contemporary Progress in Mathematics, Part 3	1.25	.25
4. General Contemporary Mathematics ($.90 per copy in lots of 40 or more)	1.00	.25
5. Sets, Operations and Patterns	3.25	.25
6. Sets, Operations and Patterns Teacher Manual	1.00	.25
7. Heritage Builders in the Arts and Sciences	1.75	.25
8. Cooperative Unit Study		
Teacher Edition	4.50	.50
Student Edition	4.00	.50
9. Cooperative Unit Study Program, Course 2	4.50	.50

N. MATERIALS AVAILABLE FREE: 30-day examination copies only of texts are available. Descriptive brochures of the institute project are available free upon request.

O. MATERIALS PURCHASABLE: Items 1-9 listed in Section M.

P. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

Q. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: None.

R. PROJECT IMPLEMENTATION:

1. Number of teachers and students using materials: Records of this type are not kept.

2. Name and location of specific schools where course is being taught: A few of these are: Watertown Public Schools, Watertown; Waltham Public Schools, Waltham; Lowell Public Schools, Lowell, Mass.; Eureka Public Schools, Eureka, and Monterey Public Schools, Monterey, California.

3. Availability of consultants for teachers: Available; members of the staff make visits both to school systems which are and which are not using project materials.

4. Activities conducted for in-service teacher training:
On campus in-service institutes are provided during the academic year. In addition, the director and staff have conducted in-service programs in other locations.

5. Implementation procedures in addition to above: Summer and academic year institutes are offered to secondary school teachers. A limited number of specialized correspondence programs are available.

6. Implementation procedure, seemingly, the most effective:

The academic year institute is the most effective means of preparing the secondary school teacher to initiate curriculum changes.

7. How evaluated: This has been evaluated by means of individual questionnaires and faculty conferences.

S. PROJECT EVALUATION: There is no formal evaluation being undertaken at present.

T. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: The project at Boston College has been involved in the following activities since 1967 report: operation of a summer, in-service, academic year institute for secondary school teachers of mathematics; consultation services for an elementary mathematics text series covering grades 1-6; authoring text series 7-8; operation of a mathematics workshop for teachers of mathematics at Robert Louis Stevenson School, Pebble Beach, California; completion of a film series on introductory topics in contemporary mathematics.

U. PLANS FOR THE FUTURE: The future plans include the continuation of the program of institutes for teachers, text book revisions, a series of television programs for the secondary school student, experimentation with laboratory devices for the mathematics classroom.

A. PROJECT TITLE: CALCULATORS IN A GENERAL MATH LABORATORY.

B. PROJECT DIRECTOR: Gene Catterton, P.O. Box 69, Wynne, Arkansas 72396. Tel. 501-BE8-2558.

C. PROJECT HEADQUARTERS:
1. Contact: Gene Catterton, Calculators in a General Math Laboratory.
2. Special facilities or activities available for visitor viewing: Math laboratory.

D. PRINCIPAL PROFESSIONAL STAFF: Gene Catterton, Director; Judy Ahart, Teacher; Ruth Van Riper, Teacher; Evelyn Underwood, Teacher.

E. PROJECT SUPPORT:
1. Organizational sponsorship: Public School.
2. Funding agencies: ESEA Title III, Local Funds.

F. PROJECT HISTORY:
1. Principal originators: Gene Catterton, Ruth Van Riper.
2. Date and place of initiation: June 1, 1966; Wynne Public School.
3. Reason for initiation: Pilot program.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PURPOSES AND OBJECTIVES: (Not answered).

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Laboratory investigations; lectures; discussion groups.

J. ORIENTATIONS OF STATED OBJECTIVES: Content mastery; process acquisition; attitudinal changes.

K. LOCATION OF LIST OF OBJECTIVES: (Not answered).

L. SPECIFIC SUBJECTS, GRADE AND AGE LEVELS: General Math, 9th grade.

M. DESCRIPTION OF MATERIALS ALREADY PRODUCED:
1. Drop-In-Mathematics.

N. MATERIALS AVAILABLE FREE: None.

O. MATERIALS PURCHASABLE: Item 1, $5.00 from project headquarters.

P. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

Q. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: (Not answered).

R. PROJECT IMPLEMENTATION:
1. Number of teachers using materials: 12.
2. Number of students involved: 729.
3. Number of schools involved: 5.
4. Sources of totals in 1, 2, and 3 above: Actual reports.
5. Name and location of specific schools where course is being taught: Northwide High School, Fort Smith, Arkansas; Dial Jr. High School, Pine Bluff, Arkansas; Hope Jr. High School, Hope, Arkansas; Annie Camp Jr. High, Jonesboro, Arkansas; Wynne Jr.

High School, Wynne, Arkansas.
6. Availability of consultants for teachers: (Not answered).
7. Activities conducted for in-service teacher training: Two day meetings conducted each month.
8. Implementation procedures in addition to above: (Not answered).

S. PROJECT EVALUATION:
1. Evaluation conducted by: Dr. Cecil McDermott, Hendrix College, Conway, Arkansas; Mrs. Betty Ann Dangeau, Wynne, Arkansas.
2. Instruments used: California Achievement Test.
3. Control groups: 3 control groups.
4. Feedback process: (Not answered).
5. Research evidence of objectives achieved: Incomplete.
6. Availability of evidence: Incomplete.

T. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: (Not previously reported).

U. PLANS FOR THE FUTURE: (Not answered).

A. PROJECT TITLE: CAMBRIDGE CONFERENCE ON SCHOOL MATHEMATICS (CCSM).

B. PROJECT DIRECTOR: Mr. Hugh P. Bradley, Education Development Center, 55 Chapel Street, Newton, Massachusetts 02160. Tel. 617-969-7100.

C. PROJECT HEADQUARTERS:
1. Contact: Mr. Hugh P. Bradley, CCSM.
2. Special facilities or activities available for visitor viewing: Copies of materials, literature about the program.

D. PRINCIPAL PROFESSIONAL STAFF: R.G. Long, Staff Mathematician. A number of people, on a consulting basis, developing materials under the direction of a Steering Committee, including: W.T. Martin, M.I.T.; P.J. Hilton, Cornell University; Andrew Gleason, Harvard University; Earle Lomon, M.I.T.; George Springer, Indiana Univ. Consultants include: E. Weiss, Boston Univ.; S. Sternberg, Harvard Univ.; M. Walter, Harvard Univ.

E. PROJECT SUPPORT:
1. Organizational sponsorship: Education Development Center.
2. Funding agency: National Science Foundation.

F. PROJECT HISTORY:
1. Principal originators: W.T. Martin, M.I.T.; Gilbert Oakley, Jr., Education Development Center.
2. Date and place of initiation: Summer 1963; Cambridge, Massachusetts.
3. Reason for initiation: To explore curriculum reform needs in mathematics with a view to a long range future.

G. PRESENT COMMERCIAL AFFILIATIONS: Houghton Mifflin, publisher of "Goals for School Mathematics" and "Goals for the Mathematical Education of Elementary School Teachers".

H. PURPOSES AND OBJECTIVES: The program grew out of a conference in 1963 which explored curriculum reform needs in mathematics. The report of the conference, "Goals for School Mathematics", outlined exploratory thinking on mathematics curriculum. While it was recognized that the CCSM is not primarily engaged in the preparation of materials for classroom use, it was felt that it was necessary to develop and try out some materials to demonstrate the feasibility of the goals. Thus, a continuing part of the program has been work, with a limited number of schools, developing and trying out units. Copies of the working papers, listed in question M, are available upon request. In recent years the attention of the program has been turned towards the problem of teacher education and the integration of mathematics and science education in the lower schools.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: (Not answered).

J. ORIENTATIONS OF STATED OBJECTIVES: Content mastery; attitudinal changes.

K. LOCATION OF LIST OF OBJECTIVES: "Goals for School Mathematics"

(Report of 1963 CCSM summer conference); "Goals for the Mathematical Education of Elementary School Teachers" (1966 conference).

L. SPECIFIC SUBJECTS, GRADE AND AGE LEVELS: Mathematics, Kindergarten through 12th grade.

M. DESCRIPTION OF MATERIALS ALREADY PRODUCED:

1. Probability.
2. Checks, Approximations and Order of Magnitude Calculations.
3. Complex Numbers Leading to Trigonometry.
4. Use of Negative Digits in Arithmetic.
5. Topology in the Tenth Grade and After.
6. The Exponential Function.
7. Multiplication of Negative Numbers.
8. Kindergarten Work on Numbers.
9. Morse School -- 1st Grade (Inequalities Unit).
10. Morse School -- 2nd Grade (Multiplication).
11. Morse School -- 3rd Grade (Chip Trading).
12. Morse School -- 3rd and 6th Grades (Graphs and their Application).
13. Morse School -- 7th Grade (Slopes and Limits).
14. Morse School -- Slopes and Limits (Lessons and Commentary).
15. Experimental Teaching -- Multiplication.
16. Palo Alto -- Second Grade (Geometry, Logic and Matrices).
17. Stanford -- Eighth Grade (Geometry through Symmetry).
18. Informal Geometry for Young Children.
19. Symmetry Motions for Elementary School.
20. Hosmer School -- 6th Grade (Elementary Number Theory).
21. Report of SMSG/CCSM Conference in March, 1965.
22. Collected reports of CCSM Writing Conference, Summer 1965.
23. Inequalities and Real Numbers as a Basis for School Mathematics.
24. Symmetry Motions -- Further Work.
25. Probability Lessons at Hancock School.
26. Inequality Lessons at Adams School.
27. Geometry in the Elementary School -- Teachers' Guide and Children's Worksheets.
28. Transformational Geometry.
29. Averages, Areas and Volumes.

N. MATERIALS AVAILABLE FREE: All materials except "Goals for School Mathematics" and "Goals for the Mathematical Education of Elementary School Teachers". Since this list is undergoing change both by addition and withdrawal, those requesting materials are asked to specify with their request the areas of the curriculum in which they are interested and the use to which materials will be put so that an intelligent selection may be made from the materials available at the time of the request.

O. MATERIALS PURCHASABLE: "Goals for School Mathematics"; "Goals for the Mathematical Education of Elementary School Teachers", $1.60 and $1.80 respectively. Purchasable at Houghton Mifflin

Company, 2 Park Street, Boston, Massachusetts.

P. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

Q. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: None.

R. PROJECT IMPLEMENTATION: (Not answered).

S. PROJECT EVALUATION:
   1. Evaluation conducted by: (Not answered).
   2. Instruments used: Reports of teachers and consultants using and developing the materials.
   3. Control groups: None used.
   4. Feedback process: (Not answered).
   5. Research evidence of objectives achieved: (Not answered).

T. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: A conference was held August/September 1967 to examine the problem of creating math/science integrating material for the lower school. Additional working papers were prepared.

U. PLANS FOR THE FUTURE: The CCSM proposed to encourage the mathematicians who attended the Cambridge Conference on Teacher Training to continue their interest in the mathematical education of elementary school teachers, and in the development of math/science integrating materials.

A. PROJECT TITLE: CENTER OF COLLABORATIVE LEARNING MEDIA PACKAGES (CLMP).

B. PROJECT DIRECTOR: Mr. George N. Moore, Curriculum Coordinator, Phillips School, 12 Seaward Road, Wellesley, Massachusetts 02181. Tel. 235-7250, ext. 17.

C. PROJECT HEADQUARTERS:
1. Contact: Mr. Leo J. LaMontagne, Project Supervisor, CLMP.
2. Special facilities or activities available for visitor viewing: Center for CLMP: publication room, woodworking shop, photographers darkroom and work room, special personnel area; classrooms using CLMP.

D. PRINCIPAL PROFESSIONAL STAFF: Leo J. LaMontagne, Project Supervisor; Ned M. Morningstar, Curriculum Materials Specialist in Social Studies; David Webster, Curriculum Materials Specialist in Science; Irene Schwachman, Photographer; Gerald Marchitelli, Designer-Cabinet Maker.

E. PROJECT SUPPORT:
1. Organizational sponsorship: Wellesley Public Schools.
2. Funding agency: Federal government ESEA Title III Operational Grant.

F. PROJECT HISTORY:
1. Principal originators: George N. Moore, Leo J. LaMontagne, Willard Woodruff.
2. Date and place of initiation: January 1965; Wellesley Public School, Wellesley, Massachusetts.
3. Reason for initiation: To seek a way to support some innovative ideas that grew within the staff for a number of years, ways which would differentiate instruction and expose children to media.

G. PRESENT COMMERCIAL AFFILIATIONS: Children's Museum of Boston, Jamaica Plain, Mass.; Abt Educational Games, Inc., Cambridge, Mass.; Elementary Science Study (E.D.C.), Newton, Mass.

H. PURPOSES AND OBJECTIVES: The project differs in many respects. One is described: All CLMP's are developed by a teacher leader and a small team of teachers supported by a team of specialists and outside consultants who work to carry out the teacher designed program. The CLMP's are not designed by the administration within a school system or by university educators. An honest attempt is being made to support a professional, choice-making, teacher as she decides what program she would like, rather than to force a technician-type teacher into following a prescribed program as dictated by administration or special departments.

The major objectives of the proposed project are:
1. To establish guidelines and procedures that will make it possible for elementary schools and curriculum development agencies to benefit one another.
2. To establish Wellesley as a model school system in

order to demonstrate and impart these effective guidelines and procedures to other school systems.
3. To assist each child in learning by saturating the classroom with many different but related activities and materials.
4. To match these activities and materials with methods that encourage pupils learning collaboratively.
5. To involve teachers in different methods of in-service training.
6. To support parent interest in the schools by developing activities and materials that will extend school learning into the home.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study; laboratory investigations; discussion groups; pupil-team learning.

J. ORIENTATIONS OF STATED OBJECTIVES: Process acquisition; attitudinal changes.

K. LOCATION OF LIST OF OBJECTIVES: (Not answered).

L. SPECIFIC SUBJECTS, GRADE AND AGE LEVELS: Science and social studies, grades 2-6, ages 7-11.

M. DESCRIPTION OF MATERIALS ALREADY PRODUCED:
1. Salt Water Aquarium.
2. Desert Life
3. Bulbs and Batteries.
4. Chemical Indicators.
5. Citizenship in a Democracy.
6. Waste: Problem Toward Solution (Pollution) - Social Studies.
7. Paper to Print - (social studies).
8. Plane and Space - (arithmetic).
9. The City: A Study in Change.
10. Primitive Societies.
11. Early Settlements.
12. Rocks.
13. Flies.
14. Wrestling - Physical Education.
15. Programmed Music - Music.
16. Space Search - Art.

N. MATERIALS AVAILABLE FREE: All items in Section M.

O. MATERIALS PURCHASABLE: None.

P. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

Q. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: None presently.

R. PROJECT IMPLEMENTATION:
1. Number of teachers using materials: 125.
2. Number of students involved: 4,472.
3. Number of schools involved: 12 entirely; various others using parts.

4. Sources of totals in 1, 2, and 3 above: Totalling number of internal staff using CLMP, plus local, private schools and other schools using parts and whole with adaptations made within their specific area.
5. Name and location of specific schools where course is being taught: Elementary schools and private schools in Wellesley.
6. Availability of consultants for teachers: Available, consultants within discipline as identified by teacher leaders.
7. Activities conducted for in-service teacher training: Curriculum materials specialists engage with small teacher teams. Teacher leader and teacher teams develop and implement CLMP's using supportive staff of specialists at the center as consultants to teachers.
8. Implementation procedures in addition to above: Teacher leaders work with their peers in developing units; resource teachers support teacher leaders and the teams.
9. Implementation procedure, seemingly, the most effective: Teacher leaders and teams meeting with teachers who will use CLMP's in their classrooms.
10. How evaluated: Amounts of material produced for children to use; evaluation of interviews and questionnaires as prepared by project evaluator of Harvard.

S. PROJECT EVALUATION:
1. Evaluation conducted by: Dr. Frederick Geis, Harvard University.
2. Instruments used: Interview, questionnaire.
3. Control groups: (Not answered).
4. Feedback process: See accompanying Development of a CLMP chart.
5. Research evidence of objectives achieved: (1) Actual materials developed in sequence form for children to use in classrooms. (2) Cooperative guidelines with educational agencies. (3) Tabulated questionnaire and graphs showing increase in use of Center.
6. Availability of evidence: Available in the form of printed documents and hardware and dissemination material.
7. Other pertinent information: First year of funding, there were 600+ visitors. Second year of funding on the way to 800+ visitors from across the country.

T. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: (Not previously reported).

U. PLANS FOR THE FUTURE: (Not answered).

A. PROJECT TITLE: CENTRAL IOWA LOW-ACHIEVER MATHEMATICS PROJECT (CILAMP).

B. PROJECT DIRECTOR: Dr. Frank W. Broadbent, 1164 26th Street, Des Moines, Iowa 50311. Tel. 515-271-3100.

C. PROJECT HEADQUARTERS:
1. Contact: Project director, CILAMP.
2. Special facilities or activities available for visitor viewing: Classrooms of teachers in the project by prior arrangement.

D. PRINCIPAL PROFESSIONAL STAFF: David R. O'Neil, Coordinator; A. Wilson Goodwin, Administrator and writer; William H. Nibbelink, writer-coordinator.

E. PROJECT SUPPORT:
1. Organizational sponsorship: Des Moines Independent Community School District.
2. Funding agency: U.S. Office of Education.

F. PROJECT HISTORY:
1. Principal originators: Dr. Paul Rosenbloom, A. Wilson Goodwin, William H. Nibbelink. A combination of CAMP (Concepts and Applications of Mathematics Project) and the Des Moines Title I Project.
2. Date and place of initiation: June 1, 1967; Des Moines, Iowa.
3. Reason for initiation: To develop materials and techniques to aid low achievers in junior high school mathematics and to train teachers in their use.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PURPOSES AND OBJECTIVES: To develop materials for use in grades 7-9 with low achievers in mathematics; to provide teachers with an appreciation of the complex problem of low achievement; to develop and implement non-conventional teaching methods; to involve local businesses and industries in a concern for the problem; to investigate the specific causes of deficiencies in different types of low achievers; to evaluate the effects of the new programs, materials and techniques on the teachers and students involved.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Lectures; seminars; discussion groups.

J. ORIENTATIONS OF STATED OBJECTIVES: Content mastery; attitudinal changes.

K. LOCATION OF LIST OF OBJECTIVES: Project Proposal and Descriptive Brochure.

L. SPECIFIC SUBJECTS, GRADE AND AGE LEVELS: Junior high school mathematics for low-achievers.

M. DESCRIPTION OF MATERIALS ALREADY PRODUCED:
1. CILAMP Descriptive Brochure.

2. Measurement, a story unit on measurement stressing conversion.
3. Roman Numerals, a story unit using Roman system as a counter example to our system of notation.
4. The Protractor, a story unit on using protractor to measure angles.
5. Gimmicks, a series of games, puzzles and high interest worksheets.
6. LAMP Booklet, contains individual projects, real life problems, etc.
7. Units on Slope, a beginning of a series of units introducing equations from physical experiments.
8. E.S.P. Kits, kits of materials that challenge math ability of individual students.

N. MATERIALS AVAILABLE FREE: None.

O. MATERIALS PURCHASABLE: Materials are experimental. Available at cost to those interested in field testing materials. Item 6, $2.00 each available through A. Wilson Goodwin, Supervisor of Mathematics, Des Moines Public Schools, 1800 Grand Avenue, Des Moines, Iowa 50307.

P. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

Q. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: None.

R. PROJECT IMPLEMENTATION:
1. Number of teachers using materials: 31.
2. Number of students involved: 1,480.
3. Number of schools involved: 26.
4. Sources of totals in 1, 2, and 3 above: Counting all mathematics students in classes of teachers listed in R1 above.
5. Name and location of specific schools where course is being taught: Ten schools in Des Moines, Iowa, and 16 in surrounding area.
6. Availability of consultants for teachers: Project director, coordinators and writers serve as consultants to teachers involved.
7. Activities conducted for in-service teacher training: Bi-weekly workshops during school year with classroom visits by project staff. A summer school for teacher training is being planned for summer of 1968.
8. Implementation procedures in addition to above: None for this phase of project.
9. Implementation procedure, seemingly, the most effective: Procedures complement each other for this group.
10. How evaluated: Not evaluated.

S. PROJECT EVALUATION:
1. Evaluation conducted by: Project staff and participating teachers.
2. Instruments used: Arithmetic section of California Achievement Test; an attitude toward mathematics questionnaire; questionnaire to participating teachers, school principals and

sample of parents.
3. Control groups: None used.
4. Feedback process: None.
5. Research evidence of objectives achieved: None.

T. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: (Not previously reported).

U. PLANS FOR THE FUTURE: The second year of this three-year project will start with an exemplary summer program using a Des Moines school for teacher training and demonstration purposes. The program will be expanded to include an additional twenty teachers. Teachers will be trained to serve as instructors for in-service workshops within their respective counties. New materials and techniques will be developed and tested in the classrooms.

A. PROJECT TITLE: CENTRAL MIDWESTERN REGIONAL EDUCATIONAL LABORATORY - COMPREHENSIVE SCHOOL MATHEMATICS PROGRAM (CEMREL-CSMP).

B. PROJECT DIRECTOR: Burt A. Kaufman, CEMREL-CSMP, 103 South Washington St., Carbondale, Illinois 62901. Tel. 618-549-5356.

C. PROJECT HEADQUARTERS:
1. Contact: Burt Kaufman, CEMREL-CSMP.
2. Special facilities or activities available for visitor viewing: Classroom visitation, interviews with staff and students, materials developed by the program.

D. PRINCIPAL PROFESSIONAL STAFF: Burt A. Kaufman, Director; Hans Georg Steiner, Chief Mathematician in Residence; Lennart Rade, Mathematician in Residence; Vincent Haag, Mathematics Education Specialist; Joseph Karmos, Assistant Director for Curriculum; David Masters, Assistant Director for Curriculum; Donald Beggs, Measurement Specialist; Peter Drees, Teacher-Writer; Jerry Exum, Teacher-Writer; Andrew Guerriero, Teacher-Writer; Roy Hajek, Teacher-Writer; Marvin Hinshaw, Teacher-Writer; Robert Hunter, Artist; Ernest Lewis, Administrative Assistant; Father Larry Lorenzoni, Teacher-Writer; Ann Narel, Elementary Co-ordinator; Leslie Woelflin, Media Specialist.

E. PROJECT SUPPORT:
1. Organizational sponsorship: Central Midwestern Regional Educational Laboratory.
2. Funding agencies: Some financial support is received from Southern Illinois University. The majority of funds are from the U.S. Office of Education.

F. PROJECT HISTORY:
1. Principal originator: Burt A. Kaufman.
2. Date and place of initiation: March, 1967; Central Midwestern Regional Educational Laboratory, Inc., St. Louis, Missouri. This program grew out of, but is distinct from, "SIU-CSMP" which was included in the 1967 Report.
3. Reason for initiation: To create an individualized mathematics curriculum (K-12) in the spirit of the Cambridge Conference recommendations.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PURPOSES AND OBJECTIVES: The purpose of this program is to develop a totally individualized mathematics curriculum based on the spirit of the Cambridge Conference report, "Goals for School Mathematics", which will utilize modern technology to its fullest potential. It is also expected that this program will create, design, and build a model school of the future in which such a curriculum would operate. To this end, a systems approach will be taken. The chief difference between this and other projects is that the substantive aspects of education, the subject matter, is stressed.

For this reason, professional mathematics will play a major and indispensable role.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study, programmed instruction, laboratory investigations, lectures, seminars, discussion groups, computer assisted instruction (once the equipment is available, computer assisted instruction is expected to be employed in much of the material).

J. ORIENTATIONS OF STATED OBJECTIVES: Content mastery, process acquisition, attitudinal changes, scientific literacy, career guidance (to the extent that the mathematics program helps a student decide upon his career).

K. LOCATION OF LIST OF OBJECTIVES: No. 2 of Section M.

L. SPECIFIC SUBJECTS, GRADE AND AGE LEVELS: Initially - mathematics K-12, but the curriculum will be ungraded; long range - all school subjects (K-12), everything to be individualized and ungraded.

M. DESCRIPTION OF MATERIALS ALREADY PRODUCED:

1. "A First Step Towards the Implementation of the Cambridge Mathematics Curriculum in a K-12 Ungraded School" - Final report of USOE Cooperative Research Project S-405. (While they last).
2. The Comprehensive School Mathematics Program - A Summary. This is a detailed description of CEMREL-CSMP which is constantly updated so as to reflect the present activities and thinking. An outline of the CSMP gifted student secondary program is included with this document.
3. A copy of a speech entitled, "The Comprehensive School Mathematics Program - Its Past, Present and Future" given for the first time on October 27, 1967, at Southern Illinois University, Edwardsville Campus.
4. Report of the Meeting of the Ad Hoc Committee on Curriculum Objectives and Program Design, September 23-26, 1967. A preliminary version of the chapter on Probability for the CSMP Handbook on the Content Dimension is included with this report.

It is understood that the text materials listed below (5, 6, 7) are for examination only. No part may be reproduced nor taught without written permission of the authors. All of these books have or will be copyrighted.

5. Foundations of Modern Algebra by Exner, Karmos, Kaufman, Steiner and Stephens. This is a textbook of four chapters (Logic, Sets, Fields and Ordered Fields, and Theory of Voting Bodies) that is used as the text for the first course of the CSMP gifted student secondary school program. The book should be completed early in the spring of 1968. Please state if you want as much as is available at the present time with the rest being sent when it is completed or whether you prefer Project Headquarters' holding the order until the entire manuscript is available. In either case the cost would

be the same.

6. Number Systems of Algebra by Exner, Karmos, Kaufman, Steiner and Stephens. This will be the second book in the gifted student secondary program and will not be completely available before June, 1969. The chapter titles as presently envisioned will be:

    1. Relations.
    2. Functions.
    3. Semi Groups, Groups, and Ordered Groups.
    4. Quadratic Extensions of Rings and Fields.
    5. Two-Dimensional Analytic Geometry over Several Fields.
    6. Axiomatization of the Real Number System by the Principle of Least Upper Bound via the Use of Tails in Linearly Ordered Sets.
    7. The Complex Number System.
    Appendix: Ranking Theories.

Similar arrangements (to those described in Item 5) for examination copies of Number Systems of Algebra are possible. Please indicate your wishes in this regard. The first two chapters should be available approximately June, 1968.

The authors of the gifted student program have not explicitly outlined any books beyond those listed in Items 5 and 6. They have, however, made a list of topics that they plan to develop into subsequent courses. (See gifted student program in Item 2.) They anticipate three or four books to evolve from these topics. Five of these units were developed in 1966 and 1967 as first approximations. The first two have already been revised and will most likely be used in their present form in the third book of this series. Both the original and revised forms of these five units are available.

7. Mathematical Induction and Recursive Definition.
    a. First draft presently available.
    b. Revised version available March 15, 1968.
8. Sequences, Series, and the Binomial Theorem.
    a. First draft presently available.
    b. Revised version available June 1, 1968.
9. Polynomial Functions.
    a. First draft presently available.
    b. Revised version available about October 1, 1968.
10. Exponential and Logarithmic Functions.
    a. First draft presently available.
    b. Revised version, availability date not known at present.
11. Permutations, Combinations and Partitions:
    a. First draft presently available.
    b. Revised version, availability date not known at present.
12. Probability.
    a. First draft presently available.
    b. Revised version, availability date not known at present.
13. "The Comprehensive School Mathematics Program" - a brochure describing CSMP and its activities available in May 1968).
14. European Satellite - A summary of the goals, activities

and future plans of the Comprehensive School Mathematics Program - Didactic Seminar Karlsruhe (CSMP-DSK) available April 1968 and included with No. 2 when available.

N. MATERIALS AVAILABLE FREE: Item 13. Contact Burt Kaufman, 103 South Washington St., Carbondale, Illinois 62901.

O. MATERIALS PURCHASABLE: Item 1, $2.50; Item 2, $4.00; Item 3, $1.00; Item 4, $2.50; Item 5, $6.00; Item 6, $6.00; Item 7a, $1.00; Item 7b, $2.00; Item 8a, $1.00; Item 8b, $2.00; Item 9a, $1.00; Item b, $2.00; Item 10a, $1.00; Item 11a, $1.00; Item 12a, $1.00.

P. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

Q. LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: It is anticipated that some of the material that has been produced for the on-going gifted student secondary program will be translated into German and Swedish. Also Project Headquarters expects many of the packages to be translated into German and other European languages by the European satellite operation.

R. PROJECT IMPLEMENTATION:

1. Number of teachers using materials: 17.
2. Number of students involved: 250-300.
3. Number of schools involved: 10.
4. Sources of totals in 1, 2, and 3 above: Item 1, 10 teachers on CSMP staff plus one from each of seven other schools; Item 2, estimated; Item 3, 3 Carbondale public schools plus 7 others.
5. Name and location of specific schools where course is being taught: University School, Southern Illinois University, Carbondale, Illinois; Carbondale Public Schools, Carbondale, Illinois; The New Lincoln School, New York; Choir School of St. Thomas Church, New York; Hopkins Senior High School, Hopkins, Minnesota; Dow's Lane School, Irvington, New York; Weston High School, Weston, Conn.; San Diego School System, San Diego, California.
6. Availability of consultants for teachers: At present, use of the materials is restricted. A policy for use of the gifted student secondary program has been developed and Project Headquarters would be happy to discuss it in detail with anyone interested. This policy does include consultant service and in-service training.
7. Activities conducted for in-service teacher training: At present, the staff does not have a teacher training program as such. However, the staff is planning a program for teacher training which will be made up of the following three specific programs:

a. The first training program will train teachers to use the gifted student secondary school materials. This program will involve an institute of four or five summers leading to the masters degree (or beyond) in

mathematics or mathematics education. The summers will be divided between the University of Syracuse and CSMP headquarters in Carbondale. Each summer program will consist of two graduate level mathematics courses specially designed for the participants and a seminar conducted by CSMP staff members in which the participants will go completely through the written materials, observe demonstration classes, and do some teaching. It is hoped that this program can be started in the summer of 1969.

b. The second training program will train teachers to try out a specific activity package with a small number of students from his own school and feed data back to project headquarters. It is anticipated that this program will be started in the fall of 1969 in the form of Saturday workshops for teachers from schools in this area. Hopefully in the summer of 1969, there will be a similar workshop for teachers from all parts of the country who desire to participate in the field testing phase.

c. The third training program will be directed toward training teachers to become leaders in their school systems for the full CSMP individualized curriculum and system, when it is available. This program will take the form of an academic year Institute (15 month) and should begin within three or four years.

8. Implementation procedures in addition to above: The procedures for implementing use of the activity package have been mapped out as follows:

a. First the package is tried out with a small number of students from University School. These students are selected from two or three grade levels for which the authors feel the package may be appropriate. On the basis of this trial, first revisions are made in the package and it is again tried with a small number of students from University School. It is anticipated that several versions of the same package will evolve from this procedure. These various versions will reflect third dimensional considerations in the curriculum matrix. A third trial is made again with University School students using the various versions and modifications. It is important to point out that all the try-outs are conducted by the authors of the package.

b. The second step is to try the package out with students from the Carbondale public schools. For these trials in the public schools, underprivileged students will be used as much as possible. Again, the various versions of the packages are revised on the basis of the results of this try-out. This process will continue until the authors feel the package is ready for try-out by a teacher not on the CSMP staff.

c. The third step is to have a teacher from a school in the surrounding area try the package with a small

number of his students. This teacher will have been trained to conduct trials of the particular activity package in the teacher training program. He will feed the data from his trial back to the authors who will further modify based on these results. This process will be continued until no further revisions are indicated as a result of the package try-outs.
d. The fourth step is to have the package tried by a trained teacher in a different geographical area. Again the process of trial and revision is repeated until the authors feel the package is completed.
e. The plans have not been fully developed beyond the fourth step.

S. PROJECT EVALUATION: The gifted student program is evaluated at present solely on the basis of teacher made instruments and team teaching techniques. The staff has also had student critiques of the books themselves. For the packages project headquarters has pre and post tests to measure prerequisites and achievement respectively. There are check points within packages where evaluation is also performed. The staff has just begun the package development this year. The staff plans on developing a sophisticated systems approach so as to maximize the matching procedure of student and package. Hopefully this development will begin during 1968.
1. Evaluation conducted by: At the present time the staff has an evaluation team consisting of 1 educational statistician and 3 graduate assistants. Their job this year is to develop pre and post tests for the packages being developed and to construct an operating paper for the long range objectives and philosophy of CSMP in the area of evaluation. The staff is planning on hiring a researcher with a strong mathematics background to head the research component of CSMP and to develop a CSMP research model. Furthermore, an advisory board of educational researchers should be formed within the next 6 months.
2. Instruments used: Teacher made tests, pre and post tests, achievement tests.
3. Control groups: Not applicable at this time.
4. Feedback process: Has not been developed.
5. Research evidence of objectives achieved: The only evidence is the individual achievement at the college level of students who have been through the gifted student program. For the most part, these students have received advanced standing from 6-12 hours and have achieved at a very high level so far.
6. Availability of evidence: Anyone interested in the entire research end of this program should contact Dr. Howard Russell at Central Midwestern Regional Educational Laboratory, Inc., 10646 St. Charles Rock Road, St. Ann, Missouri.
7. Other pertinent information: The following is a list of questions which will give the researcher an idea of the type

of questions which the staff feels the research and measurement staff of CSMP should investigate. This list is not exhaustive nor is any order or priority intended.

I. Research related to the Gifted-Student Secondary Program.

a. How does this dose of formal logic affect reading ability (speed, comprehension)? (1) In reading mathematics; (2) In reading outside of mathematics.
b. What kind of reading behavior changes can be observed?
c. Is there any observable (or measurable) effect of work in this project on study habits, or other behavior exhibited in other parts of the curriculum?
d. Investigate possible changes in I.Q. score.
e. Are there changes in arithmetic skills - particularly those of students during the time they apply themselves to this material?
f. Can one devise any scheme for describing changes in behavior of students during the time they apply themselves to this material?
g. Do any observable changes occur in expository skills?
h. Test whether self-confidence of students is increased (give them something they can do and give enough of a reward for the answer so there is virtue of getting it right and knowing it is right.)
i. Is there any way of predicting (or describing) the type of student who welcomes the explicitness of the logic, but is unwilling, or unhappy about learning to abbreviate? Are there actually such persons, or is it just a matter of degree (i.e. some take to abbreviations faster than others)?
j. How does the rigid-minded (authoritative, etc.) student fare with this material (i.e. the student who is not happy with alternatives - more than one way of doing things)?
k. What relation, if any, is there between general reading skill and success with this material?
l. Investigate the relation, if any, between this material and progress in foreign language study.
m. Devise measures, if possible, for comparing the progress of students taking this material. (Note: comparisons here mean within the group.)
n. Accepting the rating of students by their teachers, investigate background of students, and see if it can be related to ratings in course.
o. Investigate effect of providing students with answers to exercises. (1) From the beginning; (2) Later on. (One way would be to give the student the answer key and then deprive him of it. A second way would be not to give answer key for about a month and then give it to him for a month and observe.)

II. Research related to the Packages.

a. How does one describe successful achievement in use

of a package - measure it?
b. (1) Investigate effect of teacher supervision in use of package - from complete directives down to none.
(2) Prepare some material for traditional treatment and compare results.
c. Test effects of audio and visual components in packages, particularly where general motivation is not a factor.
d. What effect does this sort of regime have on developing learning skills (e.g. observe how students tackle an original problem)?
e. Does this kind of program affect creativity (e.g. find out ways of measuring student response to request to devise alternative models to fit given boundary conditions)?

T. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: In the Spring of 1967 CSMP became a part of the Central Midwestern Regional Educational Laboratory, Inc. and the name was changed from "SIU-CSMP" to "CEMREL-CSMP". Steering Committee planning meeting on May 20, 1967. Curriculum Objectives and Program Design Conference - September 23-26, 1967. Activity package development begun and initial try-outs started with elementary students from S.I.U.'s University School. Development of gifted student secondary program continued. Development of elementary program for elementary section of University School. Teaching of gifted secondary school students from Carbondale public schools. Through an agreement with the local school boards, all secondary students are bussed to the quarters daily and receive all their mathematics instruction from the staff. At the moment the staff is teaching about 100 secondary students in this program. Daily content and pedagogical seminars in September and the first two weeks of October, 1967, by Lennart Rade and Hans Steiner, the mathematicians in residence. These were of an in-service nature to train the staff for activity package writing and to set the academic flavor of the program. Operation of a European satellite of this program was started in December, 1967. This satellite is entitled "Comprehensive School Mathematics Program - Didactic Seminar Karlsruhe (CSMP-DSK)" and is located at the University of Karlsruhe, Germany. Professor Steiner is the European Co-Director. A summary of the goals and activities of CSMP-DSK should be available in April.

U. PLANS FOR THE FUTURE: Lennart Rade and Hans Steiner will be in Carbondale for one month in the Spring of 1968 and will spend the entire school year of 1968-1969 there. The Steering Committee of CSMP-DSK will meet in February, 1968. CSMP-DSK will hold a three day meeting on the Role of Logic in Education and Mathematics Teaching in Germany in July of 1968. Plans are being made for an international conference to be held in the spring of 1969 on the teaching of probability and statistics at the pre-college level. It is expected that a similar

conference will be held yearly, each conference to be devoted to a particular topic in mathematics. More activity packages will be developed and try-outs will be made. There will be continued work on the content dimension of the curriculum matrix. CSMP plans to write a series of handbooks on the various phases of the program such as content, research, media, systems, etc. The content handbook is already begun and should be finished within the next two years.

A. PROJECT TITLE: CHEMICAL EDUCATION MATERIAL STUDY (CHEM STUDY).

B. PROJECT DIRECTOR: George C. Pimentel, Professor of Chemistry, University of California, Berkeley, California 94720. Tel. 415-845-6000 ext. 3747.

C. PROJECT HEADQUARTERS:
1. Contact: Mr. David W. Ridgway, Executive Director, or Mrs. Dorothy Schatten, Secretary, CHEM Study, Lawrence Hall of Science, University of California, Berkeley, California 94720. Tel. 415-845-6000 ext 3835.
2. Special facilities or activities available for visitor viewing: None.

D. PRINCIPAL PROFESSIONAL STAFF: Mr. David W. Ridgway, Executive Director; Mrs. Dorothy Schatten, Secretary.

E. PROJECT SUPPORT:
1. Organizational sponsorships: University of California, Berkeley and (until 9/63) Harvey Mudd College, Claremont, California.
2. Funding agency: National Science Foundation.

F. PROJECT HISTORY:
1. Principal originators: Glenn T. Seaborg, Chairman, Steering Committee; J. Arthur Campbell, Director; George C. Pimentel, Editor of Text.
2. Date and place of initiation: January 9, 1960; University of California.
3. Reason for initiation: CHEM Study is an outgrowth of a study committee set up in 1959 by the American Chemical Society under the chairmanship of Prof. A. B. Garrett of Ohio State University to examine the purposes and content of high school chemistry courses with the view of introducing a drastically improved course.

G. PRESENT COMMERCIAL AFFILIATIONS: W.H. Freeman and Company, publisher, written materials; Modern Learning Aids, distributor, film materials.

H. PURPOSES AND OBJECTIVES: To diminish the separation between scientists and teachers in the understanding of science; to stimulate and prepare those high school students whose purpose it is to continue the study of chemistry in college as a profession; to further in those students who will not continue the study of chemistry after high school an understanding of the importance of science in current and future human activities; to encourage teachers to undertake further study of chemistry courses that are geared to keep pace with advancing scientific frontiers, and thereby improve their teaching methods; to guarantee the existence in the near future of a variety of excellent high school chemistry texts significantly influenced by CHEM Study but produced under a normal author-publisher relationship; to reduce the likelihood that textbooks of the future will, by their failure to keep

pace with the accelerating movement of science, make repeated curriculum studies necessary.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study; programmed instruction; laboratory investigations; lectures; seminars; discussion groups; computer assisted instruction.

J. ORIENTATIONS OF STATED OBJECTIVES: Content mastery; process acquisition; attitudinal changes; scientific literacy; career guidance.

K. LOCATION OF LIST OF OBJECTIVES: CHEM Study Newsletter, vol. 1, no. 1, November 1960.

L. SPECIFIC SUBJECTS, GRADE AND AGE LEVELS: Senior High School chemistry.

M. DESCRIPTION OF MATERIALS ALREADY PRODUCED:

1. Chemistry--An Experimental Science (textbook, 466 pages, clothbound).
2. Chemistry--An Experimental Science (laboratory manual, 138 pages, paperbound).
3. Chemistry--An Experimental Science (teachers guide, 785 pages, paperbound).
4. Programmed instruction pamphlets: Slide Rule (64 pages); Exponential Notation (31 pages).
5. Achievement tests (set of 7 open-book, multiple choice tests, including 5 tests each covering 3 or 4 chapters, a semester final and a year final); 2 series, designated 1963-64 and 1964-65.
6. Motion pictures:
   a. 26 films integrated into the course.
   b. 2 teacher training films by George C. Pimentel.
   c. A film to acquaint laymen with the course: A Chance to Wonder Why--14 minutes.
   d. A film to acquaint educators with the course: CHEM Study: Information for Educators--19 minutes.
7. A series of 17 half-hour teacher training films which may be used on TV or for screening.
8. Teacher's Guide to the CHEM Study Films (102 pages, paperbound).
9. CHEM Study Newsletter (issued as needed).
10. Bibliography of journal references to the CHEM Study materials.

N. MATERIALS AVAILABLE FREE: Items 9 and 10.

O. MATERIALS PURCHASABLE: Items 1-5 above available from W.H. Freeman Co., 660 Market Street, San Francisco, California 94104 (list prices F.O.B. shipping point, subject to normal educational discount). Item 1, $5.80; Item 2, $1.60; Item 3, $7.00 (free to teachers using the textbook in quantity); Item 4, $0.50/set; Item 5, $1.00/set. Items 6-7 films available from Modern Learning Aids, 1212 Avenue of the Americas, New York, New York 10036. Item 8, $2.00 (free with purchase

or rental of three or more films) from Modern Learning Aids.

P. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

Q. LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: Written materials: Chinese, French, Hebrew, Hindi, Gujarati, Japanese, Spanish, Thai, and Turkish; in progress: Korean, Portuguese. Film materials: Danish, French, German, Spanish, Swedish; in progress: Italian.

R. PROJECT IMPLEMENTATION:

1. Number of teachers using materials: 10,000.
2. Number of students involved: 450,000.
3. Number of schools involved: 6,900.
4. Sources of totals in 1, 2, and 3 above: Reports from publisher and film distributor.
5. Name and location of specific schools where course is being taught: Approximately 40% of high schools in United States.
6. Availability of consultants for teachers: Available. CHEM Study headquarters will provide names and addresses.
7. Activities conducted for in-service teacher training: NSF Institutes--information obtainable from NSF; Teacher Training films--described under M-7.

S. PROJECT EVALUATION:

1. Evaluation conducted by: None at present.
2. Instruments used: Trial editions of course materials were tested over a three year period in a total of 550 schools with about 60,000 students.
3. Control groups: None used at the present time.
4. Feedback process: An important feedback has been the sale of approximately 650,000 copies of the text and 800,000 copies of the laboratory manual. Questionnaires have been received from twelve colleges concerning the achievement of some 7500 chemistry students.
5. Research evidence of objectives achieved: Usage and adoption of the materials; achievement of students at the college level; articles in journals.
6. Availability of evidence: CHEM Study headquarters will provide bibliography of articles in journals.

T. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: Translation of written materials and films into several foreign languages.

U. PLANS FOR THE FUTURE: Written materials and films will be sold to commercial companies for continued distribution. A minimum staff will be maintained to supervise remaining business activities and to carry out contractual obligations.

A. PROJECT TITLE: COMPUTER-BASED MATHEMATICS INSTRUCTION AT THE STANFORD-BASED LABORATORY FOR LEARNING AND TEACHING.

B. PROJECT DIRECTOR: Professor Patrick Suppes, Institute for Mathematical Studies in the Social Sciences, Ventura Hall, Stanford University, Stanford, California 94305. Tel. DA1-2300.

C. PROJECT HEADQUARTERS:
1. Contact: Prof. Patrick Suppes, Computer-based Mathematics Instruction at the Stanford-based Laboratory for Learning and Teaching.
2. Special facilities or activities available for visitor viewing: Tour of an elementary school.

D. PRINCIPAL PROFESSIONAL STAFF: Mr. Max Jerman, Director of Curriculum Operations.

E. PROJECT SUPPORT:
1. Organizational sponsorship: Stanford University.
2. Funding agencies: U.S. Office of Education and National Science Foundation.

F. PROJECT HISTORY:
1. Principal originators: Prof. Patrick Suppes, Prof. Richard C. Atkinson, and Prof. William K. Estes.
2. Date and place of initiation: Summer 1963; Stanford University.
3. Reason for initiation: To provide a controlled environment for psychological and pedagogical studies of learning.

G. PRESENT COMMERCIAL AFFILIATIONS: No direct commercial affiliations. Equipment being used has been purchased or leased from IBM, Philco, Westinghouse, and Digital Equipment Corporation.

H. PURPOSES AND OBJECTIVES: To develop an operational drill-and-practice program in elementary school mathematics, grades 1-6; to develop remedial work in basic mathematics for secondary school students at the drill-and-practice level; to develop a tutorial program in mathematical logic and algebra, and to develop a drill-and-practice program in spelling. The objective of both laboratories is then to test and evaluate these programs in as quantitative and in as scientific a way as is possible with methods of quantitative data analysis and behavioral and psychological theory.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study; programmed instruction; computer assisted instruction; classroom instruction.

J. ORIENTATIONS OF STATED OBJECTIVES: Content mastery; process acquisition.

K. LOCATION OF LIST OF OBJECTIVES: (Not answered).

L. SPECIFIC SUBJECTS, GRADE AND AGE LEVELS: Mathematical logic, 5-8; arithmetic drill and practice, grades 1-6.

M. DESCRIPTION OF MATERIALS ALREADY PRODUCED: A large body of

curriculum material encoded for use in computer systems. (Not available for distribution).

N. MATERIALS AVAILABLE FREE: See page 161, Section N.

O. MATERIALS PURCHASABLE: None.

P. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

Q. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: None.

R. PROJECT IMPLEMENTATION:

1. Number of teachers using materials: 80.
2. Number of students involved: 1,865.
3. Number of schools involved: 21.
4. Sources of totals in 1, 2, and 3 above: Institute records.
5. Name and location of specific schools where course is being taught: The following is a partial listing: Garden Oaks Junior High, East Palo Alto, California; Peter Burnett Junior High, San Jose, California; Eva Gordon Attendance Center, Magnolia, Mississippi; Job Corp Center, Clinton, Iowa; Breckinridge University, M.S.U., Kentucky.
6. Availability of consultants for teachers: Available; to conduct workshops in curriculum planning, to hold monthly meetings with teachers, to visit each project school daily and to meet with each teacher.
7. Activities conducted for in-service teacher training: Small group meetings by grade level or school building to define behavioral objectives, study summary teacher reports to aid in individualization in classroom, operational problems, etc.
8. Implementation procedures in addition to above: (Not answered).
9. Implementation procedure, seemingly, the most effective: The four-weeks teacher workshop held in the summer.
10. How evaluated: Mathematics achievement tests and questionnaires completed by teachers at the end of the workshop and again later in the year.

S. PROJECT EVALUATION:

1. Evaluation conducted by: Staff and participating school district staff members.
2. Instruments used: Stanford achievement tests.
3. Control groups: There is at least one control class for each project. It is chosen on the basis of computational skills, IQ, and socioeconomic level.
4. Feedback process: Test results are scored and tabulated by machine.
5. Research evidence of objectives achieved: (Not answered).
6. Availability of evidence: (Not answered).

T. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: (Not answered).

U. PLANS FOR THE FUTURE: (Not answered).

A. PROJECT TITLE: CONCEPTUALLY ORIENTED PROGRAM FOR ELEMENTARY SCIENCE (COPES).

B. PROJECT DIRECTOR: Professor Morris H. Shamos, New York University, COPES Project, 4 Washington Place, Room 502, New York, N.Y. 10003. Tel. 212-598-3735.

C. PROJECT HEADQUARTERS:
1. Contact: Professor Shamos, COPES.
2. Special facilities or activities available for visitor viewing: Special laboratory set-ups, concept tests, and teacher's guide for a conservation of energy sequence.

D. PRINCIPAL PROFESSIONAL STAFF: Morris H. Shamos, Director; J. Darrell Barnard, Associate Director; Janice A. Cutler, Senior Research Scientist; Bobby J. Woodruff, Associate Research Scientist; Katherine E. Hill, Science Educator.

E. PROJECT SUPPORT:
1. Organizational sponsorship: New York University.
2. Funding agency: U.S. Office of Education.

F. PROJECT HISTORY:
1. Principal Originators: Morris H. Shamos and J. Darrell Barnard.
2. Date and place of initiation: September 1965; New York University.
3. Reason for initiation: To test the feasibility of a conceptual schemes approach to curriculum development in elementary science.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PURPOSES AND OBJECTIVES: To develop an elementary science curriculum based upon selected "great ideas" or conceptual schemes in science. Such unifying ideas as the kinetic-molecular theory, the statistical view of the universe, the conservation principles, the gene theory of heredity, etc., are the main goals of science and should form the core of the science curriculum. Each conceptual scheme selected for the COPES curriculum is to be developed through a structured K-6 learning sequence. Although the materials are designed to involve children in various methods of investigation the primary objective is the understanding of concepts.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Laboratory investigations, discussion groups.

J. ORIENTATIONS OF STATED OBJECTIVES: Scientific literacy, concept development.

K. LOCATION OF LIST OF OBJECTIVES: In the published Teacher's Guide.

L. SPECIFIC SUBJECTS, GRADE AND AGE LEVELS: Elementary science, K-6, 5-12 years old.

M. DESCRIPTION OF MATERIALS ALREADY PRODUCED:

1. Descriptive brochure.
2. Newsletter No. 1.
3. Newsletter No. 2.
4. A Pilot Project to develop an elementary science sequence.
5. A Teacher's Guide for a conservation of energy sequence.

N. MATERIALS AVAILABLE FREE: Items 1, 2, 3 obtainable from project address.

O. MATERIALS PURCHASABLE: Item 5 cost $5.00 obtainable from project address.

P. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

Q. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: No plans.

R. PROJECT IMPLEMENTATION:
1. Number of teachers using materials: 14.
2. Number of students involved: 350.
3. Number of schools involved: 2.
4. Sources of totals in 1, 2, and 3 above: Actual count of those involved in the pilot testing of materials in the schools.
5. Name and location of specific schools where course is being taught: Kensington-Johnson School, Great Neck, N.Y.; Parkville School, New Hyde Park, N.Y.
6. Availability of consultants for teachers: During the test period, staff worked closely with teachers.
7. Activities conducted for in-service teacher training: Beginning September, 1968, an in-service physical science course based upon conceptual schemes approach will be taught to a selected class of 60 elementary school teachers.
8. Implementation procedures in addition to above: The Teacher's Guide for a Conservation of Energy Sequence is available to teachers who wish to try the materials.
9. Implementation procedure, seemingly, the most effective: No evidence as yet.
10. How evaluated: No evidence as yet.

S. PROJECT EVALUATION:
1. Evaluation conducted by: Evaluation was conducted by staff during pilot study.
2. Instruments used: COPES Test of Science Concepts (parts 1, 2, 3); COPES Test of Critical Terms.
3. Control groups: Yes, they were chosen by random assignment.
4. Feedback process: In the pilot study, feedback was obtained from teachers by using an open-ended questionnaire.
5. Research evidence of objectives achieved: A Pilot Project to develop an Elementary Science Sequence.
6. Availability of evidence: Available through ERIC.

T. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: Completed the pilot study with conservation of energy, beginning with a new conceptual scheme, "Order from disorder; a statistical

view of nature."

U. PLANS FOR THE FUTURE: Develop a teacher's guide for a sequence dealing with a conceptual scheme: "Order from disorder; a statistical view of nature."

A. PROJECT TITLE: COURSE DEVELOPMENT PROJECT IN QUANTITATIVE PHYSICAL SCIENCE (QPS).

B. PROJECT DIRECTOR: Dr. Sherwood Githens, Jr., Department of Education, Duke University, College Station, Durham, North Carolina 27708. Tel. 919-684-3924.

C. PROJECT HEADQUARTERS:
1. Contact: Project Director, QPS.
2. Special facilities or activities available for visitor viewing: Any school participating in the project.

D. PRINCIPAL PROFESSIONAL STAFF: Associate Director: Bernard D. Toan; Consultants: John F. Lavach, Melba S. Schauman.

E. PROJECT SUPPORT:
1. Organizational sponsorship: Department of Education, Duke University.
2. Funding agencies: Mary Duke Biddle Foundation, The Duke Endowment, The Charles F. Kettering Foundation.

F. PROJECT HISTORY:
1. Principal originator: Dr. Sherwood Githens, Jr.
2. Date and place of initiation: Fall 1962; Duke University and Durham County Schools.
3. Reason for initiation: To provide a more effective course to replace "general science" and textbook-based courses in physical science.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PURPOSES AND OBJECTIVES: To provide guidance to administrator and teacher so that the latter can successfully teach primarily through guided experiences rather than through a textbook. The objective is for the student to develop knowledge, skills, and vocabulary through an organized series of experiences. The staff seeks to promote this method of instruction feeling that it will simultaneously result in: greater student and teacher interest, a general-education course, and specific preparation for the student to obtain greater benefit from the more modern courses in senior-high biology, chemistry, and physics.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Guided measurement operations and other classroom activities listed in the brochure and teacher's manual.

J. ORIENTATIONS OF STATED OBJECTIVES: Content mastery; process acquisition; attitudinal changes; scientific literacy; assistance to the teacher; assistance to the school system administration regarding choice and acquisition of equipment and facilities; design of certain equipment items followed by pilot-lot production.

K. LOCATION OF LIST OF OBJECTIVES: In the descriptive brochure and Volume I of Teacher's Manual. Also stated in Journal of Research in Science Teaching, Vol. 2, pp. 345-348 (1964).

L. SPECIFIC SUBJECTS, GRADE AND AGE LEVELS: Physical Science, pri-

marily for 9th grade (age 14), but usable in grades 7 through 12.

M. DESCRIPTION OF MATERIALS ALREADY PRODUCED:
1. Descriptive brochure (13 pages mimeographed).
2. Newsletters to cooperating teachers and administrators.
3. Teacher's Manuals (6 volumes, mimeographed).
4. Worksheet package (96 manipulative learning operations, MLO, worksheets).
5. Interim textbook (211 pages, lithoprinted).
6. Lists of equipment and suppliers.

N. MATERIALS AVAILABLE FREE: Item 1 from project headquarters.

O. MATERIALS PURCHASABLE: At this time the staff has no materials for general sale as samples. To schools that have decided to acquire the related equipment and try teaching the course as the staff has planned it, the staff supplies materials at a slight increase over cost of production.

P. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

Q. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: Possibly into German.

R. PROJECT IMPLEMENTATION:
1. Number of teachers using materials: 56 in 1967-1968.
2. Number of students involved: 4,864 in 1967-1968.
3. Number of schools involved: 43 in 1967-68 in fourteen states.
4. Sources of totals in 1, 2, and 3 above: Data supplied by the schools.
5. Name and location of specific schools where course is being taught: The following is a partial listing: Anderson W. Clark Jr. High School, Glendale, California; Lakewood Senior High School, Denver, Colorado; Clarke County Junior High School, Athens, Georgia; Maine Township High School West, Des Plaines, Illinois; Harry E. Wood High School, Indianapolis, Indiana; Garrison Junior High School, Baltimore, Maryland; The Harley School, Rochester, New York; Josephus Daniels Jr. High School, Raleigh, North Carolina; Bowsher High School, Toledo, Ohio; Andrew Jackson High School, Portland, Oregon; The Hill School, Pottstown, Pennsylvania; Episcopal High School, Alexandria, Virginia; Joel E. Ferris High School, Spokane, Washington; Horace Mann Junior High School, West Allis, Wisconsin.
6. Availability of consultants for teachers: Several consultants are available, but due to paucity of project funds their services are very limited.
7. Activities conducted for in-service teacher training: The staff conducts none, but has suggested to the cooperating school systems that they might conduct in-service teacher training.
8. Implementation procedures in addition to above: The QPS Teacher's Manual is designed to be as nearly self-explanatory as possible.
9. Implementation procedure, seemingly, the most effective: Experience shows that a willing and interested teacher can

successfully operate with the Teacher's Manual alone and without ad hoc training.

10. How evaluated: No teacher has ever indicated any difficulty in using the Teacher's Manual. No teacher has quit. Generally they express pleasure over the help the Manual gives them.

S. PROJECT EVALUATION:

1. Evaluation conducted by: Evaluation is a cooperative effort of the cooperating systems and the staff.
2. Instruments used: Questionnaires and pre- and post-testing.
3. Control groups: Most of the cooperating schools have control sections of comparable students taking some other course in physical science.
4. Feedback process: Via reports from teachers and coordinators and the testing program. Also visitation.
5. Research evidence of objectives achieved: Continued participation on the part of cooperating schools, gradual growth, and numerous expressions of appreciation.
6. Availability of evidence: Anyone who wishes to investigate what the staff is doing is welcomed to do so. To date the staff has not prepared any formal report, but expects to do so in August 1968.

T. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: (Not previously reported).

U. PLANS FOR THE FUTURE: The staff hopes to have prepared a general report on the whole operation in August 1968.

A. PROJECT TITLE: DEMONSTRATION AND EXPERIMENTATION IN COMPUTER TRAINING AND USE IN SECONDARY SCHOOLS.

B. PROJECT DIRECTOR: Prof. Thomas E. Kurtz, Kiewit Computation Center, Dartmouth College, Hanover, New Hampshire 03755. Tel. 603-646-2643.

C. PROJECT HEADQUARTERS:
1. Contact: John Nevison, Demonstration and Experimentation in Computer Training and Use in Secondary Schools.
2. Special facilities or activities available for visitor viewing: G-E-625 and 16 Time Shared Teletypes.

D. PRINCIPAL PROFESSIONAL STAFF: Project Coordinator, John M. Nevison; Assistant Director, Prof. William E. Slesnick; Kiewit Center Assistant Director (Administration), Thomas E. Byrne.

E. PROJECT SUPPORT:
1. Organization sponsorship: Dartmouth College.
2. Funding agency: National Science Foundation.

F. PROJECT HISTORY:
1. Principal originator: Thomas E. Kurtz.
2. Date and place of initiation: March 15, 1962; Dartmouth College.
3. Reason for initiation: Experiment with time shared computer in high schools on a large scale.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PURPOSES AND OBJECTIVES: The purpose of this project is to demonstrate the large-scale use of the computer as a broad aid to secondary education without requiring major curriculum changes or extensive teacher retraining. Through materials to be developed cooperatively with the participating schools, the staff expects to show the value of computing as an aid to course teaching in many subjects, and as a significant mechanism for extra-curricular education of students. It is expected that these materials, appropriately reviewed and modified during the course of the project, will provide important guidelines for the development of the potential of computers in secondary education on a broad front.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study, laboratory investigations, lectures, seminars, computer assisted instruction.

J. ORIENTATIONS OF STATED OBJECTIVES: Content mastery, process acquisition, attitudinal changes, scientific literacy.

K. LOCATION OF LIST OF OBJECTIVES: In the proposal to the National Science Foundation.

L. SPECIFIC SUBJECTS, GRADE AND AGE LEVELS: Mathematics, 7-12; science, 7-12; social sciences, 7-12 - ages 10-17.

M. DESCRIPTION OF MATERIALS ALREADY PRODUCED:

1. Report on a Summer Training Session.
2. Topic Outline by Peyton Pitney, "How to introduce the computer to ninth graders".
3. NSF Project proposal.
4. Mid-year Report.

N. MATERIALS AVAILABLE FREE: Items 2, 3, and 4.

O. MATERIALS PURCHASABLE: Item 1.

P. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: BASIC and English.

Q. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: None.

R. PROJECT IMPLEMENTATION:
1. Number of teachers using materials: 40.
2. Number of students involved: 3,600.
3. Number of schools involved: 18.
4. Sources of totals in 1, 2, and 3 above: 18 schools, some with more than one teacher and about 200 students per school.
5. Name and location of specific schools where course is being taught: Bishop Bradley High School, Manchester, N.H.; Cape Elizabeth High School, Cape Elizabeth, Maine; Concord High School, Concord, N.H.; Hanover High School, Hanover, N.H.; Hartford High School, Hartford, Vermont; Keene High School, Conway, N.H.; Lebanon High School, Lebanon, N.H.; Manchester Central High School, Manchester, N.H.; Mascoma Valley Regional High School, W. Canaan, N.H.; Mount Hermon School, Mt. Hermon, Massachusetts; Phillips Academy, Andover, Massachusetts; Phillips Exeter Academy, Exeter, N.H.; South Portland High School, South Portland, Maine; Rutland High School, Rutland, Vermont; St. Johnsbury Academy, St. Johnsbury, Vermont; St. Paul's School, Concord, N.H.; Timberlane Regional High School, Plainstow, N.H.; Vermont Academy, Saxton River, Vermont; Windsor High School, Windsor, Vermont.
6. Availability of consultants for teachers: Coordinator visits schools every second month.
7. Activities conducted for in-service teacher training: Summer Training Session; periodic Saturday meetings throughout year.
8. Implementation procedures in addition to above: Biweekly Bulletin, Teacher's Newsletters, and an inter-school contest for good programs.
9. Implementation procedure, seemingly, the most effective: Information out to teachers biweekly; information in from teachers and students contest.
10. How evaluated: Visits to schools and write-ups obtained in the contest.

S. PROJECT EVALUATION:
1. Evaluation conducted by: John Nevison.
2. Instruments used: Questionnaires, computer usage records, contest results, visits to schools, teacher's reports.
3. Control groups: None used.

4. Feedback process: Contest for good students; computer programs and interesting teacher class uses.
5. Research evidence of objectives achieved: Many interesting programs, enthusiastic students, and exciting classrooms.
6. Availability of evidence: Write for a Mid-year Report.

T. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: (Not previously reported).

U. PLANS FOR THE FUTURE: June 1968, Writing conference; September 1968 - June 1969, Second year in schools with emphasis on social science uses.

A. PROJECT TITLE: A DEMONSTRATION OF THE ROLE OF SCIENCE IN THE PROGRAMS OF EDUCATIONALLY DEPRIVED CHILDREN IN GRADES 7-9. (S.E.L. PILOT PROJECT).

B. PROJECT DIRECTOR: N. Eldred Bingham, Professor of Science Education, University of Florida, Gainesville, Florida 32601. Tel. 904-376-3261, ext. 2908.

C. PROJECT HEADQUARTERS:
1. Contact: Project Director, S.E.L. Pilot Project.
2. Special facilities or activities available for visitor viewing: None at the moment.

D. PRINCIPAL PROFESSIONAL STAFF: N. E. Bingham, Professor of Science Education; C. Hines Cronin, Curriculum Specialist; C. Robert Cronin, Helping Teacher; Larry J. Paulk, Curriculum Specialist.

E. PROJECT SUPPORT:
1. Organizational sponsorships: Southeastern Education Laboratory, Inc., P.O. Box 20867, Airport Branch, Atlanta, Georgia 30320.
2. Funding agency: See Section E1.

F. PROJECT HISTORY:
1. Principal originators: N.E. Bingham, C. Hines Cronin and C. Robert Cronin.
2. Date and place of initiation: September 1966; Ribault Junior High School, Senior High School, Jacksonville, Florida.
3. Reason for initiation: To find if, through the use of small group science activities conducted in a hospitable learning situation, educationally disadvantaged under-achievers, could improve their attitude toward their teachers and toward their school and thus continue to take advantage of the offerings of the school rather than become dropouts.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PURPOSES AND OBJECTIVES: It was a pilot program with randomly selected participants from a pool of educationally deprived under-achievers identified in the 7th, 8th, and 9th grades. It stressed treating each student with respect as an individual of worth; use of overhead projector in initiating small group activities and in summarizing findings of groups; communication and interaction with students learning to talk and write and read because they understood what was being considered.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Laboratory investigations; a directed-discovery approach using overhead projector and laboratory groups of 3.

J. ORIENTATIONS OF STATED OBJECTIVES: Scientific literacy; as a vehicle for improving attitudes toward teachers and towards the schools.

K. LOCATION OF LIST OF OBJECTIVES: Page 2 of Final Project Report; page 1 of Handbook (implied in this case).

L. SPECIFIC SUBJECTS, GRADE AND AGE LEVELS: General Science, grades 7, 8, and 9, age levels 13-16.

M. DESCRIPTION OF MATERIALS ALREADY PRODUCED:
1. Handbook for Teaching Science to Educationally Disadvantaged Youth.
2. Final Project Report to the Southeastern Education Laboratory, Inc. on "A Demonstration of the Role of Science in the Programs of Educationally Deprived Children in Grades 7-9."
3. A Prospectus for an extended demonstration research program entitled, "DISCUS - A Demonstration of an Improved Science Curriculum for Underachieving Students."

N. MATERIALS AVAILABLE FREE: None at present.

O. MATERIALS PURCHASABLE: None at present.

P. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

Q. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: (Not answered).

R. PROJECT IMPLEMENTATION:
1. Number of teachers using materials: 32.
2. Number of students involved: 1100.
3. Number of schools involved: 16.
4. Sources of totals in 1, 2, and 3 above: This project became a part of a much enlarged project to be carried on during the next three years.
5. Name and location of specific schools where course is being taught: All participating schools in the Jacksonville area; a partial listing follows: Bethune-Cookman #145; Matthew Gilbert #146; Eugene Butler #168; James Weldon Johnson #152; Duncan U. Fletcher #63; Northwestern #155; Ribault Junior High School #212; Jeb. Stewart Junior High School; Paxon Jr. High School.
6. Availability of consultants for teachers: Available. From county office and from University of Florida.
7. Activities conducted for in-service teacher training: The staff holds frequent meetings going over materials to be taught, discussing success with materials used, and projections for weeks ahead. Also projective tests are given by graduate students of university team.
8. Implementation procedures in addition to above: Equipment is prepared and distributed from county office. Overhead projectors are used in nearly every session in connection with small group laboratory work.
9. Implementation procedure, seemingly, the most effective: All seem effective.

S. PROJECT EVALUATION:
1. Evaluation conducted by: Project leaders and consultants under guidance of University of Florida.
2. Instruments used: Step Tests for grades 4, 5, 6; Battle Student Attitude Scale, projective interviews, and written

projective test.
3. Control groups: Used, chosen by random means from pool of 2500 students. Also 32 teachers of control groups selected along with teachers of 32 experimental groups selected by random means from pool of 63 teachers.
4. Feedback process: In frequent meetings.
5. Research evidence ofobjectives achieved: Quite substantial.
6. Availability of evidence: Available in form of project report from pilot study from C. Hines Cronin, Director DISCUS Project, Duval County Public Schools, 1011 Gilmore Street, Jacksonville, Florida 32204.

T. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: (Not previously reported).

U. PLANS FOR THE FUTURE: The staff has underway an extensive 3 year project, financed mainly by county, but partly by Title I and is considering a regional expansion of the project.

A. PROJECT TITLE: DEVELOPMENT OF A CORE-COURSE FOR COLLEGE SCIENCE MAJORS COMBINING MATERIAL FROM INTRODUCTORY COURSES IN BIOLOGY, CHEMISTRY AND PHYSICS - PHASE III.

B. PROJECT DIRECTOR: Arnold D. Pickar, Portland State College, Portland, Oregon 97201. Tel. 503-226-7271, ext. 337.

C. PROJECT HEADQUARTERS:
1. Contact: Project director, Development of a Core-Course for College Science Majors.
2. Special facilities or activities available for visitor viewing: (Not answered).

D. PRINCIPAL PROFESSIONAL STAFF: Arnold D. Pickar, Associate Professor of Physics; Alfred S. Levinson, Associate Professor of Chemistry; David R. Malcom, Professor of Biology; Kwan Hsu, Associate Professor, Bio-physics; Michael A. Fiasca, Associate Professor of Science and Education.

E. PROJECT SUPPORT: U.S. Office of Education and Portland State College.

F. PROJECT HISTORY:
1. Principal originators: Mark Gurevitch, former Acting Dean of Science; Arnold D. Pickar.
2. Date and place of initiation: January 1966 (Phase I); January 1967 (Phase II); Portland State College.
3. Reason for initiation: To develop a syllabus for a course for science majors which could be initially put into operation at Portland State College and serve as a model for similar programs at other institutions.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PURPOSES AND OBJECTIVES: This course is intended for the serious science students who would profit from enrolling in introductory courses in biology, physics, and chemistry. It is intended that completion of the combined 2 year course will prepare the student to undertake a major in any of these three disciplines or in pre-medicine or pre-dentistry. Among the advantages envisioned for the student are increased efficiency and flexibility in the use of his course-hour load. This course is not intended for general education or liberal arts majors (as is, for instance, the "baccalaureate science" program at Rensselaer Polytechnic Institute).

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Laboratory investigations; lectures; discussion groups.

J. ORIENTATIONS OF STATED OBJECTIVES: Content mastery; scientific literacy.

K. LOCATION OF LIST OF OBJECTIVES: Page 1 of Final Report referred to in Section M below.

L. SPECIFIC SUBJECTS, GRADE AND AGE LEVELS: Physics, chemistry, and biology at the lower division college science major level.

M. DESCRIPTION OF MATERIALS ALREADY PRODUCED:
1. Final Report for Project No. 6-8468.

N. MATERIALS AVAILABLE FREE: Item 1 from Bureau of Research, Office of Education, Washington, D.C.

O. MATERIALS PURCHASABLE: None.

P. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

Q. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: (Not answered).

R. PROJECT IMPLEMENTATION:
1. Number of teachers using materials: 4.
2. Number of students involved: 60.
3. Number of schools involved: 1.
4. Sources of totals in 1, 2, and 3 above: All students enrolled in the core-course (including Phase I and Phase II programs) in fall term of 1966. (Does not include approximately 30 failures or withdrawals.)
5. Name and location of specific schools where course is being taught: Portland State College, Portland, Oregon.
6. Availability of consultants for teachers: None available.

S. PROJECT EVALUATION:
1. Evaluation conducted by: Michael A. Fiasca, Associate Professor of Science Education, Portland State College.
2. Instruments used: Subject matter questions inserted into regular examinations; attitude survey containing 15 questions on academic interest, course and career plans, evaluation of instruction, etc.
3. Control groups: Each student is matched with a student in a conventional course in biology, chemistry, or physics on basis of high school GPA, sex, year in school, etc.
4. Feedback process: The same personnel teaching the course are directly involved in the planning, development, and evaluation work on the course.
5. Research evidence of objectives achieved: Using above instruments, results from experimental and control groups have been compared using a paired t-test analysis. Results indicate subject matter achievement at least equal to that attained in conventional counterpart courses, as well as improved flexibility in planning academic programs.
6. Availability of evidence: Preliminary work is in Final Report for Phase I. (See Item M above).
7. Other pertinent information: Plans have been made and support is being sought to carry out a "long-range" evaluation study extending to 1971.

T. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: (Not previously reported).

U. PLANS FOR THE FUTURE: Interdisciplinary laboratory development: 1968-1970; "long-range" evaluation studies: 1968 through at least 1971.

A. PROJECT TITLE: EARTH SCIENCE CURRICULUM PROJECT (ESCP).

B. PROJECT DIRECTOR: Joseph L. Weitz, Earth Science Curriculum Project, P.O. Box 1559, Boulder, Colorado 80302. Tel. 303-447-8150.

C. PROJECT HEADQUARTERS:
1. Contact: Joseph L. Weitz, Director, ESCP.
2. Special facilities or activities available for visitor viewing: Films, laboratory equipment, video tape recordings of ESCP classes, visits to local schools using ESCP.

D. PRINCIPAL PROFESSIONAL STAFF: Majorie H. Gardner, Director, Teacher Preparation; John F. Thompson, Associate Director, Teacher Preparation; Larry A. Irwin, Staff Assistant, Teacher Preparation; Edward C. Maruna, Staff Assistant, Teacher Preparation; Robert E. Samples, Director, Instructional Materials Development Program; William B. Nelson, Director of Publications.

E. PROJECT SUPPORT:
1. Organizational sponsorship: American Geological Institute.
2. Funding agency: National Science Foundation.

F. PROJECT HISTORY:
1. Principal originator: American Geological Institute.
2. Date and place of initiation: May 1963; Boulder, Colorado.
3. Reason for initiation: To improve secondary school science education.

G. PRESENT COMMERCIAL AFFILIATIONS: Houghton Mifflin Company; Encyclopaedia Britannica Educational Corporation; Prentice-Hall, Inc.; The Natural History Press; Hubbard Scientific Company; Damon Educational, Inc.; Raytheon Education Company (formerly Macalaster).

H. PURPOSES AND OBJECTIVES: This program provides an interdisciplinary approach to earth science which weaves the various disciplines together to provide a comprehensive view of the planet earth and its environment. A series of investigations provide the student with experience to better understand the content. The main difference between this and earlier efforts is the interdisciplinary treatment and the investigative nature of the approach.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study; laboratory investigations; lectures; discussion groups.

J. ORIENTATIONS OF STATED OBJECTIVES: Content mastery; process acquisition; attitudinal changes; scientific literacy; career guidance; stimulation of student inquiry, creativity and interest in the real world; final science course for some; base for further science courses for others.

K. LOCATION OF LIST OF OBJECTIVES: Integrated, not listed as such (except in the guide to each chapter relating to that chapter).

L. SPECIFIC SUBJECTS, GRADE AND AGE LEVELS: All of the earth sciences--astronomy, geology, geography, meteorology, and oceanography--are served. The materials are developed for ninth grade students in the 13 to 15 age bracket. However, about 1/4 of the children now in the course are at the eighth grade level.

M. DESCRIPTION OF MATERIALS ALREADY PRODUCED:
1. Investigating the Earth (textbook/laboratory manual, and two-volume teacher's guide).
2. Teacher training film, Toward Inquiry.
3. Newsletters nos. 1-14.
4. Reference series pamphlets nos. 1-6.
5. Subject matter film, How Solid is Rock?
6. Brochures, catalogs, and teacher orientation material.
7. Laboratory investigations, equipment for.
8. Teacher Information Bulletin, published monthly.

N. MATERIALS AVAILABLE FREE: Item 2; Item 3, published quarterly from Project Headquarters; Item 6, from Project Headquarters; Item 8, available to teachers from Project Headquarters.

O. MATERIALS PURCHASABLE: Item 1, (commercial edition available from Houghton Mifflin Company, 110 Tremont Street, Boston, Mass. 02107), Text $8, Guide, $10. Item 2, available from local Encyclopaedia Britannica Educational Corporation regional office, cost $75. Item 4, Educational Book Division, Prentice-Hall, Inc., Englewood Cliffs, N.J. 07632, $1 per set of 3. Item 7, complete package (class of 30 students) from Hubbard Scientific Company, $895; Damon Educational, Inc., $776; Raytheon Education Co. (formerly Macalaster Scientific Corporation), $776.

P. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

Q. LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: French, Spanish, Japanese, Portuguese.

R. PROJECT IMPLEMENTATION:
1. Number of teachers using materials: 1,000+.
2. Number of students involved: 100,000+.
3. Number of schools involved: 900+.
4. Sources of totals in 1, 2, and 3 above: As the present program has progressed beyond the evaluation stage and the adoption of Investigating the Earth is left to the decision of individual school systems, the staff has no means by which to calculate exact totals. The staff has estimated the above totals from lists of school districts which have ordered classroom quantities from Houghton Mifflin, and from teachers who completed an insert in the latest Newsletter requesting the Teacher Information Bulletin.
5. Name and location of specific schools where course is being taught: On request for any area for which the staff has information. In many cases the staff has addresses of school districts only. See section R4.

6. Availability of consultants for teachers: Available. Teachers who conducted ESCP classes during the three years of nationwide evaluation are willing to give of their time in helping new teachers in their area. Project personnel and Steering Committee members will help where possible.
7. Activities conducted for in-service teacher training: Project personnel conduct an in-service course each semester through the University of Colorado; visits to summer institutes; promotion of in-service proposals; Cooperative College-School Science program through University of Colorado, 1968; Workshops.
8. Implementation procedures in addition to above: Film, Toward Inquiry.
9. Implementation procedure, seemingly, the most effective: Institutes and workshops where participants are actively involved with the ESCP materials.
10. How evaluated: Personal (written) participant evaluation forms and verbal comments.

S. PROJECT EVALUATION:

1. Evaluation conducted by: There is no formal evaluation at the present time. The Psychological Corporation conducted the evaluation from 1964-1966.
2. Instruments used: Differential Aptitude Tests, Test of Science Knowledge, ESCP Comprehensive Final and Teacher and Student Feedback. At present, ESCP staff are conducting the course at Southern Hills Jr. High School, Boulder.
3. Control groups: None used at present.
4. Feedback process: 1964-1965 and 1965-1966, Formal Feedback; 1966-1967, Informal Feedback. Written feedback was received from each teacher in the evaluation program each week of the school year. In addition, the test center contributed written feedback as well as specific subject matter experts who were paid to review the materials for content accuracy. ESCP staff members visited every test teacher at least twice during the school year, spending a half day watching and reacting to the teaching and learning situation and the effect the materials were having. All of this feedback was processed in the ESCP office and put in a form that could be used by the writers responsible for rewriting. The staff also analyzed the feedback and were guided by it in creating policy regarding revisions. Students also contributed written feedback.
5. Research evidence of objectives achieved: Psychological Corporation 1965 End-of-Year Analysis (now out-dated). Currently individual research is being conducted on the hard-back edition of Investigating the Earth
6. Availability of evidence: Not available as yet.
7. Other pertinent information: All evaluation is subjective and can be interpreted as you wish.

T. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT:

Completing final revision for commercial two-volume teacher's guide to Investigating the Earth; completion of subject matter

film, How Solid is Rock?; concentration of efforts on teacher preparation program.

U. PLANS FOR THE FUTURE: Ancillary materials presently under development will be continued. These include single topic pamphlets, field study guides, and more Reference Series pamphlets. 16 mm films are being produced and 8 mm single concept loops are being selected. TV tapes of classes, lectures, critiques are in the preliminary stages. Teacher training will occupy the majority of the staff's time.

A. PROJECT TITLE: ELEMENTARY CURRICULUM MATERIALS PROJECT.

B. PROJECT DIRECTOR: Richard C. Youngs, Metcalf School, Illinois State University, Normal, Illinois 61761. Tel. 309-438-2453.

C. PROJECT HEADQUARTERS:
1. Contact: Richard C. Youngs, Elementary Curriculum Materials Project.
2. Special facilities or activities available for visitor viewing: Materials can be seen in use.

D. PRINCIPAL PROFESSIONAL STAFF: Richard C. Youngs, Director; Charles R. Hicklin, Associate Director; Robert E. Rumery, Evaluation Specialist; Richard C. Youngs, and Thomas F. Edwards, Science Specialists; Kenneth A. Retzer, Wilson P. Banks, and John H. Esbin, Jr., Mathematics Specialists; Larry Kennedy, Language Arts Specialist.

E. PROJECT SUPPORT:
1. Organizational sponsorship: Illinois State University.
2. Funding agencies: Department of Program Development for Gifted Children, State of Illinois; Office of the Superintendent of Public Instruction, Springfield, Illinois.

F. PROJECT HISTORY:
1. Principal originators: Theodore Sands and Charles R. Hicklin.
2. Date and place of initiation: 1961; Illinois State University.
3. Reason for initiation: To produce self-instructional materials for gifted children.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PURPOSES AND OBJECTIVES: This project has addressed itself to the problem of developing instructional materials in a self-instructional format for use with gifted students in the early primary grades. Specific objectives of this project have been:
1. To create and test a sequence of instructional experiences which would enable a gifted student while working independently to develop concepts which were considered basic to a discipline but not usually encountered in the early elementary grades.
2. To develop these concepts in a way which would require the bringing into play higher thought processes such as translating, interpreting, extrapolating, applying, analyzing, and evaluating.
3. To identify a strategy of instruction which would enable such materials to be used in the public schools with a minimum of teacher attention and participation, require no special training of the teacher, and be adaptable to the current patterns of administrative arrangements for instruction of the gifted.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Programmed instruction; laboratory investigations.

J. ORIENTATIONS OF STATED OBJECTIVES: Content mastery; process acquisition; scientific literacy.

K. LOCATION OF LIST OF OBJECTIVES: Final Report: "The Development and Testing of Instructional Materials For Gifted Primary Pupils." pp. 20-24.

L. SPECIFIC SUBJECTS, GRADE AND AGE LEVELS: The elementary materials written to date are: Measurement (grades 1-3), Atomic Structure (grades 1-4) and Nature of Molecules (grades 2-4).

M. DESCRIPTION OF MATERIALS ALREADY PRODUCED:

1. Measurement:
   a. Teacher manual.
   b. Work booklets, 18 exercises.
   c. Record, 18 exercises.
   d. Manipulative materials.
   e. ECMP Measurement Achievement Test.
2. Atomic Structure:
   a. Teacher manual.
   b. Work booklets, 16 exercises.
   c. Records, 16 exercises.
   d. Experimental apparatus.
   e. Manipulative materials.
   f. ECMP Atoms Achievement Test.
3. Nature of Molecules:
   a. Teacher manual.
   b. Work booklets, 14 exercises.
   c. Records, 14 exercises.
   d. Experimental apparatus.
   e. Manipulative materials.
   f. ECMP Atoms Achievement Test.

N. MATERIALS AVAILABLE FREE: 1965 Final Report, The Development and Testing of Instructional Materials for Gifted Primary Pupils; 1966 Final Report, Concept Development Materials for Gifted Elementary Pupils Atom, Molecule, and Measurement Achievement tests (limited supply).

O. MATERIALS PURCHASABLE: Items 1a-d, 2a-e, and 3a-e from project headquarters.

P. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

Q. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: None.

R. PROJECT IMPLEMENTATION:

1. Number of teachers using materials: 35.
2. Number of students involved: 415.
3. Number of schools involved: 58.
4. Sources of totals in 1, 2, and 3 above: Reference to data given in the 1966 Final Report.
5. Name and location of specific schools where course is being taught: See 1966 Final Report.
6. Availability of consultants for teachers: Available to

describe use of materials.
7. Activities conducted for in-service teacher training: A consultant is available.
8. Implementation procedures in addition to above: None.

S. PROJECT EVALUATION:
1. Evaluation conducted by: Robert E. Rumery, Department of Psychology, Illinois State University.
2. Instruments used: Project developed tests.
3. Control groups: Yes; see 1965 Final Report for description of how they were chosen.
4. Feedback process: Extensive; described in 1965 Final Report.
5. Research evidence of objectives achieved: See 1965 and 1966 Final Reports.
6. Availability of evidence: Available; ask for Final Reports.

T. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: (Not previously reported).

U. PLANS FOR THE FUTURE: Production of units for later elementary in the areas of geography, social studies, meteorology. Commercial publication of the present units.

A. PROJECT TITLE: ELEMENTARY-SCHOOL SCIENCE PROJECT (ASTRONOMY).

B. PROJECT DIRECTOR: J. Myron Atkin, Professor of Science Education, College of Education, University of Illinois, Urbana, Illinois 61801. Tel. 217-333-0961. Stanley P. Wyatt, Jr., Professor of Astronomy, University of Illinois, 108 Observatory, Urbana, Illinois 61801. Tel. 217-333-3090.

C. PROJECT HEADQUARTERS:
1. Contact: J. Myron Atkin, Elementary-School Science Project (Astronomy), University of Illinois, 805 West Pennsylvania Avenue, Urbana, Illinois 61801. Tel. 217-333-1846.
2. Special facilities or activities available for visitor viewing: None.

D. PRINCIPAL PROFESSIONAL STAFF: J. Myron Atkin; Stanley P. Wyatt, Jr.; Peter B. Shoresman, Science Education, University of Illinois; Ben Peery, Astronomy Department, Indiana University; Henry Albers, Astronomy Department, Vassar College; Karlis Kaufmanis, Astronomy Department, University of Minnesota; Gibson Reaves, Astronomy Department, University of Southern California.

E. PROJECT SUPPORT:
1. Organization sponsorship: University of Illinois.
2. Funding agency: National Science Foundation.

F. PROJECT HISTORY:
1. Principal originators: J. Myron Atkin and Stanley P. Wyatt, Jr.
2. Date and place of initiation: 1960; Urbana, Illinois.
3. Reason for initiation: To update astronomy instruction in grades 5 through 9.

G. PRESENT COMMERCIAL AFFILIATIONS: Harper and Row.

H. PURPOSES AND OBJECTIVES: This project represents the view of certain astronomers with respect to concepts considered central to an understanding of this subject field by children in the upper elementary grades. It differs from similar projects in that astronomers were encouraged to develop materials that they thought reflected the subject field. The project developed its objectives throughout the duration of the developmental work--instead of starting with a list of objectives that was considered to be complete.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study; programmed instruction; laboratory investigations; discussion groups.

J. ORIENTATIONS OF STATED OBJECTIVES: Content mastery; process acquisition; attitudinal changes; scientific literacy; career guidance.

K. LOCATION OF LIST OF OBJECTIVES: In the Teacher Manuals.

L. SPECIFIC SUBJECTS, GRADE AND AGE LEVELS: Astronomy, grades 5 through 9.

M. DESCRIPTION OF MATERIALS ALREADY PRODUCED:
1. Charting the Universe.
2. The Universe in Motion.
3. Gravitation.
4. The Message of Starlight.
5. Life Story of a Star.
6. Galaxies and the Universe.

N. MATERIALS AVAILABLE FREE: Progress report from Project Headquarters.

O. MATERIALS PURCHASABLE: Items 1 through 6 at $1.50 each. Teachers' Guides for items 1 through 6 at $1.50 each. Available from Project Headquarters.

P. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

Q. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: Portuguese.

R. PROJECT IMPLEMENTATION:
1. Number of teachers using materials: About 400.
2. Number of students involved: About 12,000.
3. Number of schools involved: About 70.
4. Sources of totals in 1, 2, and 3 above: Counting.
5. Name and location of specific schools where course is being taught: The following is a partial listing: Mills Jr. High, Rancho Cordova, California; West Jr. High School, Columbia, Missouri; Warren Jr. High School, West Newton, Massachusetts; Roton Jr. High School, South Norwalk, Connecticut; Forest Park Jr. High School, Euclid, Ohio; Chatham Park Elementary School, Havertown, Pennsylvania.
6. Availability of consultants for teachers: Not yet available; they will be available through Harper and Row.
7. Activities conducted for in-service teacher training: None directly.

S. PROJECT EVALUATION:
1. Evaluation conducted by: Dr. Peter B. Shoresman.
2. Instruments used: Objective tests and observation scales.
3. Control groups: Yes; chosen astutely.
4. Feedback process: Test results and teacher reactions.
5. Research evidence of objectives achieved: A final report will be available when it is completed.

T. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: (Not answered).

U. PLANS FOR THE FUTURE: Phase out.

A. PROJECT TITLE: ELEMENTARY SCIENCE STUDY (ESS).

B. PROJECT DIRECTOR: Randolph R. Brown, 55 Chapel Street, Newton, Massachusetts 02160. Tel. 617-969-7100, ext. 504.

C. PROJECT HEADQUARTERS:
1. Contact: Randolph R. Brown, ESS.
2. Special facilities or activities available for visitor viewing: In-house workshops are held periodically for school administrators, science supervisors, etc. Visits should be made by appointment only, through Mr. Frank Watson's office.

D. PRINCIPAL PROFESSIONAL STAFF: David Alexander, Beth Barth, Winfield Benner, Randolph Brown, Merle S. Bruno, Edith H.E. Churchill, Rose L. Crowley, Dorothy Curtis, Merill Fellger, William H. Floyd, Robert Gardner, Mary S. Gillmor, Joe Griffith, Christopher Hale, Jay Hauben, George Hein, William P. Hull, Flores LeBoeuf, John H. Merrill, Martin C. Michener, Adeline Naiman, Frieda S. Ployer, Douglas Seager, Mary Lela Sherburne, Robert H. Stinson, Virginia B. Strong, Rosly M. Walter, Frank Watson, Daniel H. Watt, David Webster, William H. Weston.

E. PROJECT SUPPORT:
1. Organizational sponsorships: Education Development Center (formerly Educational Services Incorporated).
2. Funding agencies: National Science Foundation. (ESS is sometimes asked by teacher training or research organizations or schools to work out a program of introduction of the materials, and ESS has accepted small grants for such short-term efforts, e.g., Peace Corps, Cardozo Model School District.)

F. PROJECT HISTORY:
1. Principal originator: Education Development Center (formerly Educational Services Incorporated).
2. Date and place of initiation: 1960; Cambridge, Massachusetts.
3. Reason for initiation: With the increasing importance of science and technology in today's society, there was a need to up-grade science and math in the secondary schools to better prepare students for college studies in these areas. A number of curriculum development groups undertook this task, and out of one of these the Physical Science Study Committee--Educational Services Incorporated (now known as Education Development Center) was organized. As the PSSC program progressed, it was decided to initiate a similar effort for the elementary schools with emphasis on materials that would engage the interest of all students.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PURPOSES AND OBJECTIVES: Primarily ESS hopes to develop more meaningful science materials for use by children in the form of units which schools can arrange in a variety of sequences to meet their own requirements. The program is a highly individual experimental one in which all children have access to the materials for open-ended rather than teacher or textbook

directed investigations. Careful attention is given to all materials used so that all equipment looks like materials which are normally accessible to children in their own environment and not imposingly "scientific." A mix of university scientists and master teachers work together in the laboratories and in classrooms to test and revise their ideas before the materials are released for general use in the schools. ESS materials have been used equally successfully in middle-class suburban and low socio-economic areas, large cities and small towns, and a great variety of different situations.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study; laboratory investigations; discussion groups.

J. ORIENTATIONS OF STATED OBJECTIVES: Attitudinal changes; scientific literacy; cross disciplinary boundaries.

K. LOCATION OF LIST OF OBJECTIVES: Objectives are not stated in isolation. They are written into the teacher's guides as an integral part of the text.

L. SPECIFIC SUBJECTS, GRADE AND AGE LEVELS: See Section M.

M. DESCRIPTION OF MATERIALS ALREADY PRODUCED:

Commercial editions available (January, 1968):
1. Attribute Games and Problems (grades K-8). The subject matter of this unit is logic, but the emphasis is on developing problem-solving skills and attitudes. Children explore problems of classification and become skillful in dealing with the relationships between classes. These materials are designed for use from kindergarten through junior high school by small groups of children. Older children may work independently; the teacher introduces the games and problems to younger children. Equipment: three kinds of blocks, loops; printed matter: teacher's guide, problem cards.
2. Behavior of Mealworms (grades 4-6). This unit stimulates children to ask questions about the observable behavior of an unfamiliar animal and then directs them to ways of finding answers for themselves. Equipment: mealworms, food, containers; printed matter: teacher's guide, two student booklets (How Barn Owls Hunt and How A Moth Escapes from its Cocoon), set of pictures; film: one 16 mm, black and white, sound: How to Make a Mealworm Back Up (for teachers).
3. Bones (grades 4-6). This unit engages the students in becoming familiar with a variety of bones; noticing similarities and differences; and making skeletons. Equipment: disarticulated skeletons, assorted bones; printed matter: teacher's guide, two student booklets (Bones Picture Book, How to Make a Chicken Skeleton); film: five 8 mm loops, black and white: X-ray Motion Pictures Head and Neck, X-ray Motion Pictures Shoulder, X-ray Motion Pictures Knee and Elbow, X-ray Motion Pictures Hand, X-ray Motion Pictures Foot.
4. Gases and "Airs" (grades 5-8). This is an introductory unit examining some properties of gases in a series of closely

linked laboratory experiments in which children analyze the interaction of air with "things" in the environment. Equipment: tubes, candles, steel wool, seeds; printed matter: teacher's guide, worksheets; film: one 16 mm, black and white, sound: Gases and "Airs" in the Classroom (for teachers), four 8 mm loops, color: Candle Burning Techniques, Candle Burning I, Candle Burning II, The Mouse and The Candle.

5. Curious Gerbils (supplementary student book). This is a handbook for children on the care of these small classroom animals. It also suggests some experimental questions on diet and behavior.

6. Growing Seeds (grades K-3). In this unit children plant a collection of seeds and non-seeds to see which ones grow. They dig up some of the seeds to find out what happens underground. Then each student plants a new corn seed and cuts a strip of paper daily showing the height of his plant. Children find that the collection of strips can tell a lot about the way their plants grew. Equipment: seeds, soil, containers; printed matter: teacher's guide; film: two 8 mm loops, color: Bean Sprouts, Plant Growth-Graphing.

7. Kitchen Physics (grades 5-7). This is a first course in science drawn from the child's environment. The student investigates the properties of common liquids--typically water, soapy water, oil, alcohol, and syrup. He considers a number of questions about the behavior of these liquids which directs his attention to such attributes as the way they are absorbed, evaporate, drop, stream, and interact with various surfaces. Equipment: drip tubes of varying diameters, liquids, balances, droppers, container; printed matter: teacher's guide, worksheets; film: three 8 mm film loops, color: Beading of a Water Column, Water Rise in Blotter Strips of Graded Width, Water Rise in Blotter Strips Exposed and Enclosed.

8. Light and Shadows (grades K-3). This is a beginning unit in geometric optics. Children use many shapes and their own movements to examine shadows and light sources. Printed matter: teacher's guide.

8a. Mirror Cards (grades 1-7). This unit uses mirrors and cards with carefully designed patterns on them to help children become acquainted simultaneously with some elementary geometric optics and the concepts of symmetry. Equipment: cards, mirrors; printed matter: teacher's guide.

9. Mystery Powders (grades 3-4). This unit deals with the properties of various substances and the use of indicators in detecting their presence. Students try to identify some unknown white powders by tasting, smelling, feeling, and comparing them with known substances. Additional investigations with heat, iodine, and vinegar identify specific reactions with several of the powders. To conclude, the children attempt to determine the presence of individual powders when two or more are mixed together. Equipment: sugar, salt, baking soda, starch, plaster of Paris, vinegar, iodine, heat source, containers; printed matter: teacher's guide.

10. Small Things--An Introduction to the Microscopic World (grades 5-7). This unit introduces the child to the microscopic world, the instruments needed to make it accessible, and the differences in appearance and structure of non-living and living things. Equipment: microscopes, slides, stains, plants, crystals, pond cultures; printed matter: teacher's guide, student booklet (The Faithful Eye of Robert Hooke), worksheets, set of pictures; film: one 16 mm, color, sound: Paramecium, Euglena, and Amoeba (for children); one 16 mm, black and white, sound: A Small Things Classroom (for teachers); eleven 8 mm loops, color: Paramecium, Euglena, Amoeba, Budding of Yeast Cells, Blepharisma, Stentor, Rotifer, Vorticella, Volvox, Stylonychia, Comparative Sizes of Microscopic Animals.
11. Tangrams (grades K-8). This is an ancient Chinese geometrical puzzle. Seven pieces are formed from the dissection of a square: two small triangles, a medium triangle, two large triangles, a square and a rhomboid. A great many geometrical arrangements can be made from these seven pieces. This unit is an adaptation which starts with various subsets of the full seven piece set and supplies "analysis" cards which will help children become familiar with certain basic combinations. There is a wide range of difficulty in the hundred or so cards which are provided along with the geometrical shapes. Equipment: tangram pieces; printed matter: teacher's guide, cards sets.
12. Where is the Moon? (grades 2-6). This is an introduction to observational astronomy. During a period of three months the children are given approximately forty notes called "Reminders." Each note describes an event that the children can see in the sky. The children's observations of the moon, sun, a bright planet, and a few easy to find starts are the basis of the study. Printed matter: teacher's guide, booklet (Moon Book), reminders.

Commercial editions expected to be available in 1968:
13. Activity Wheels (grades 2-5). These are exercise wheels for small animals, to which are attached counters to measure the number of turns the wheel makes. Using an activity wheel, it is possible to gather data on the activity of animals under varying conditions. Some of the factors that can be tested are the effect on activity of: hunger, age, size of cage, noise, light and day, number of animals, and type of animal. Equipment: activity wheel with counter, cage, animals; printed matter: teacher's guide.
14. Batteries and Bulbs (grades 4-8). This provides an introduction to the study of electricity and magnetism, in the course of which children investigate such things as ways to light several bulbs with one battery, what happens when more than one battery is used, whether varying lengths and types of wire influence the brightness of bulbs, and the effects different patterns of wires, bulbs, and batteries have on the brightness of bulbs. Equipment: flashlight batteries, small bulbs, various kinds of wire, compasses, magnets; printed

matter: teacher's guide in four books (Circuits I, Circuits II, Circuits and Magnets, Guide to Books).

15. Balance Book (including Mobiles) (grades 1-3). This unit provides some special equipment with which the child can investigate balance and weight explicitly. By working with an assortment of balances--seesaws, pan balances, equal-arm and unequal-arm balances--the child can develop increasingly sophisticated notions of balance and weight. Equipment: walk-on boards, 4-foot boards, pan balances, things to weigh; printed matter: teacher's guide (The Balance Book), booklet (Mobiles).

16. Changes (grades 1-4). In this unit children predict what things will change when left by themselves. Tney make up lists of things that they think will or will not change and then proceed to bring these into class to verify their predictions. During the course of several weeks food becomes garbage, wet metals rust, liquids become cloudy, maggots may appear, and rocks remain rocks. From the nature and timing of these processes the children develop their own sense of biological and physical changes. Equipment: plastic boxes, baby food jars, foods, liquids, metals, crystals, powders, seeds, and other materials.

17. Colored Solutions (grades 4-6). By using various concentrations of salt solutions identified by color, this unit attempts to introduce children to some phenomena which will lead them to perform experiments associated with the ideas of density and the layering of liquids. The results of their experiments form a foundation of facts from which they may make predictions and draw conclusions as they tackle new activities. Equipment: plastic trays and cylinders, salt solutions, eye droppers, and food coloring; printed matter: teacher's guide.

18. Eggs and Tadpoles (grades K-8). In this unit the natural development from fertilized egg to adult frog is examined under classroom conditions. The care and fostering of the animals and the total development of the frog require only a few minutes observation and handling each day, plus an occasional period for discussion and summary. Equipment: fertilized frog eggs, aquaria, pond water; printed matter: teacher's guide; film: two 16 mm, color, silent: Frog Development: Fertilization to Hatching; Frog Development: Hatching through Metamorphosis; eight 8 mm loops, color: Frog Egg I: First Cell Division to Early Neural Fold; Frog Egg II: Development of the Body Regions; Frog Egg III: Continued Development to Hatching; Frogs: Pairing and Egg Laying; Artificial Fertilization of Frog Eggs; Frogs: Pituitary Preparation; Tadpoles I; Tadpoles II.

19. Euglena (grades 6-8). This is a unit in which children are challenged to grow euglena, eventually by themselves, in sterile culture. It is an extension of Small Things for project-oriented students. The activities are organized around such questions as: How do they reproduce? How fast do they grow?

Are they plants or animals? Do cultures always die out? Why? Equipment: small bottles, flasks, transfer loops, cotton, microscope slides, pipettes, euglena broth powder; printed matter: teacher's guide; film: one 8 mm loop, color: Euglena Dividing.

20. Ice Cubes (grades 4-6). This unit deals with variations of the general question, "What makes an ice cube melt faster or slower?" Children determine how long it takes an ice cube to melt in the air and in different amounts of water. They see who can keep an ice cube the longest; they explore the melting rates of funny-shaped ice cubes and begin to develop intuitive ideas about surface-volume relations. They collect data and learn a good deal about plotting tables and graphs. Equipment: thermometers, ice, containers; printed matter: teacher's guide.

21. Microgardening (grades 4-7). This unit helps children gain familiarity with the rapid growth and the remarkable diversity of molds. Children become familiar with and readily develop pure culture procedures adequate for carrying out experiments that lead to understanding the reasoning of the great pioneers in medicine, agriculture, microbiology, and food technology. They gain appreciation of the importance of molds and other micro-organisms in the great cycles of growth and decay. Equipment: containers, nutrient media; printed matter: teacher's guide, booklet (Illustrated Handbook of Some Common Molds).

22. Pattern Blocks (grades K-5). This unit consists of a set of blocks of wood in the shapes of regular polygons: triangles, squares, trapezoids, diamonds, hexagons, with each shape painted its own color. There are many patterns and designs which can be made with these blocks, and this gives great scope for children to build large triangles or diamonds or trapezoids out of the blocks, and arithmetical questions arise as to the relation of the length of the side of the figure to the number of blocks needed. A group of elegant geometrical questions can be posed about repeating patterns and symmetries. Equipment: blocks; printed matter: teacher's guide.

23. Peas and Particles (grades 4-6). This consists of a series of classroom activities in counting and estimating. Starting with low numbers and progressing towards "millions and billions," the children estimate beans on a paper, rice grains in jars and others. They develop and criticize their own indirect counting methods. Equipment: rice, beans, balls, containers; printed matter: teacher's guide, charts, set of pictures.

24. Playframes (grades K-2). These are pieces of equipment which provide opportunities for both mechanical and dramatic play within the classroom. Equipment: playframes and accessories; printed matter: teacher's guide.

25. Printing Press (grades K-2). This is a movable-type press on which children compose, select, type, and print their work. This press can support work in all subject matter areas in addition to science. Lower grade children, particularly, are stimulated to learn to read and write and observe. Equipment:

press, type, printing ink, type rack, ink rollers, and accessories; printed matter: teacher's guide.

26. Rocks and Charts (grades 3-5). This is a unit in which each pair of children has a set of twenty-one rocks. The children establish ways of comparing these rocks and set their own standards to define certain properties such as hard and soft, and heavy and light. They make charts telling the rocks' characteristics, and then exchange charts to see if they can understand each other's. Equipment: rocks, balances, streak plates, hand lenses and others; printed matter: teacher's guide.

Units in trial teaching 1967-1968:

27. Balancing (Senior) (grades 4-7). This is a unit in which children hang washers on strips of pegboard suspended from a nail. They learn how to identify problems involving balance and to make use of various strategies to solve the problems. An intuitive understanding of moments of force and center of mass underlie the study. Equipment: pegboard, nails, washers, and others; printed matter: teacher's guide, cards.

28. Balloons (grades 4-7). Children prepare gases which are captured in plastic bags, balloons, and weather balloons. The gases are weighed and tested by various chemical means so that children become aware of the relative densities and methods of identifying the gases. By weighing air, lung air, carbon dioxide, and hydrogen in different atmospheres, the buoyant effect comes into play. By weighing balloons filled with different liquids in "atmospheres" of various liquids, children become capable of predicting the relative densities of the liquids. They then check their predictions empirically. Equipment: balances, balloons, plastic bags and containers, flasks, and various chemicals; printed matter: teacher's guide, worksheets, experiment sheets.

29. Beans and Peas (grades K-4). This is a booklet to enable teachers to grow beans and peas in their classrooms. Bean seeds of many different varieties obtained from the local grocer's shelf will grow into adult plants in about six weeks. Any classroom in practically any weather can boast of flowering bean plants which bear pods with seeds. The booklet, primarily designed to insure the class a supply of healthy plants, also contains teaching suggestions for children's observations and individual projects. Photographs of the plant at various stages of its development and accounts of the laboratory experience give the teacher an idea of what to expect and when.

30. Brine Shrimp (grades 1-7). Brine shrimp are tiny, salt lake, arthropods, whose eggs remain viable when dried. Younger children observe the eggs and the minute larvae when they hatch, then watch them grow into adults. Older children can, in addition, explore a number of questions. For example: Do brine shrimp eggs hatch faster in salt water than in fresh? How do the reactions of brine shrimp toward light change as

they grow older? What is their rate of swimming? Because it is so easy to raise hundreds of these animals, statistical answers to many behavioral questions can be found. Equipment: brine shrimp eggs, salt water, containers; printed matter: teacher's guide; film: one 16 mm, color, silent: Brine Shrimp; two 8 mm loops, color: Brine Shrimp I, Brine Shrimp II.

31. Budding Twigs (grades 4-6). In this unit children observe the first budding of a large collection of twigs. Water supply, light, temperature, length of twig, position of bud, and other such possible growth factors are considered. Equipment: twigs, containers; printed matter: teacher's guide, children's book (Buds and Twigs).

32. Clay Boats (grades 3-5). In this unit an attempt is made to acquaint children with some of the problems associated with buoyancy, density, and volume displacement in liquid. Children are given lumps of clay and asked to see if they can make them sink or float. Eventually children form the clay into boat-like shapes, load them, sometimes sink them, and discover some properties associated with various shapes, sizes, thicknesses, and weights. Equipment: clay, containers, loading materials; printed matter: teacher's guide.

33. Crayfish (grades 3-6). This unit uses the common, readily available crayfish as a typical representative of the fresh water environment and yields to the students an understanding of the feeding habits, reaction and relations to the environment of these animals which are readily managed, maintained, and observed in the classroom. Equipment: crayfish, containers; printed matter: teacher's guide.

34. Drops, Streams and Containers (grades K-4). This unit is a guide to play and investigation with liquids. Children examine flow, drop formation, and other properties of water, soapy water, oil, and other available liquids, using a variety of containers, surfaces, drops, and tubes. Equipment: bottles with holes, caps with holes, eye droppers, medicine caps, tubing, paper towels and wax paper; printed matter: teacher's guide.

35. Earthworms (grades 4-7). This is one of a group of activities which offer children the opportunity to uncover various relationships between an organism and the environment through experiments which evaluate the organism's response to a choice of environmental factors. In this unit children learn something of the behavior and biology of earthworms on a statistical basis by placing them in inexpensive plastic "choice" tubes. Various different conditions are established at either end of the tubes, e.g., dry sand vs. damp humus, light vs. dark. The children insert earthworms into the tubes at midpoint and observe preferences when given a choice of conditions.

36. Geo Blocks (grades K-5). These blocks were designed to provide children with manipulative materials and experience which can be related to the more strictly academic subject matter, such as: geometric relations; classification; linear, area, and volume measurement and equivalents; and others.

A wide variety of shapes and sizes is provided to stimulate expressive building and imaginative visualization of more detailed problems. Equipment: blocks; printed matter: teacher's guide.

37. Beginning Mapping (grades 2-4).

38. Outdoor Mapping. By examining methods of transforming and transmitting various types of information (particularly two-dimensional representations of three-dimensional objects), students concern themselves with pattern recognition, scalin , congruence, ordering, discreteness, similarity, barriers, boundary conditions, and distortions. Vehicles for doing this include: student gathered information about their "world", maps, air photos, anaglyphs, sand-stream tables, and numerous other tools.

39. Optics (grades 5-8). This is aimed at acquainting children with the ideas of reflection, refraction, color, and variations of optical path using many different materials. Experiments with narrow and broad light beams, multiple reflections, colored shadows, and refraction through water lenses are devised and examined. Equipment: light source, mirrors, containers color filters; printed matter: teacher's guide.

40. Pendulums (grades 4-6). This unit uses a frame that supports two pendulums. Working in pairs, children compare the effects of length of string, weight of bob, and amplitude. They find out how long to make the strings in order to double, triple, quadruple the pendulum's period. They study factors that make pendulums die down faster and they also add couplings between the two strings. Equipment: frame, string, bobs; printed matter: teacher's guide; film: five 8 mm loops, color: Sand Pendulum I: Drawing Circles, Lines and Ellipses; Sand Pendulum II: Drawing on a Turntable; Sand Pendulum III: Drawing Lines on a Traveling Table; Sand Pendulum IV: Slowing Down; Sand Pendulum V: Pouring Sand into Soda Straws.

41. Pond Water (grades 3-8). This unit uses as basic material the teeming plant and animal life of fresh water ponds, and gets the students to participate in following the development of representative plants and animals, bringing out the inter-dependence of organisms concerned and familiarizing the children with representative forms from microscopic plants and animals to the more familiar larger forms. Equipment: pond water, containers, microscopes; printed matter: teacher's guide, study cards.

42. Sand (grades 2-5). This is a unit which uses graded, colored sand which, appealing aesthetically, invites a wide variety of explorations of a scientific nature. Sand can be thought of as analogous to water, and poured, measured and dripped. Sand can also be sorted, piled, looked at through a hand lens, rolled down various surfaces, strained, crushed, and weighed. Children make sand clocks, sandpaper, sand sculpture, and sand pendulums. Sand is seen as a material for primary classrooms which would invite children to explore it, write about it, use it as an art medium, and in various

ways to use it to inter-relate many aspects of their school day.

43. Sink and Float (grades 4-6). The materials in this introduction to density of solids and liquids consist of things that sink and things that float in tap water and salt water. Among the things that sink in tap water are some that float in salt water. By working with materials and liquids of different densities and by varying densities, e.g., by adding Plasticine to a solid object or salt to water, it becomes apparent that whether or not an object will or will not float depends jointly upon its density and the density of the liquid into which it has been placed. Construction and use of hydrometers is one possible extension. Equipment: containers, Plasticine, materials of different densities, salt; printed matter: teacher's guide.

44. Slips and Slides (grades 5-6). Children establish "slipperiness" orders by determining the force needed to move blocks with different surfaces along several types of horizontal plane. Additional problems include the effects of weight and surface area on frictional forces; the effect of an inclined plane on the forces needed to move bodies; the utilization of wheels in reducing friction, and the need for experimental controls. Children are asked to predict on the basis of the empirical information they have acquired. Reading involving some classical experiments in friction, as well as some theories of friction, are provided along with experiments which can be performed at home.

45. Spinning Tables (grades K-3). This unit introduces children to circular motion. Small groups work with hand-driven turntables on which they can draw or spin marbles, blocks, and containers of liquids and powders. A maximum of eight children can work with the equipment at any one time. No set length of time is required for the unit.

46. Starting from Seeds. This unit deals with the responses of oat seedlings to light and gravity. Children do experiments to establish changes in direction of growth of stem and roots and the rate at which they occur under controlled conditions. Equipment: oat seedlings, containers, vermiculite, slides, cellophane tape; printed matter: teacher's guide.

47. Structures (grades 3-7). In this unit children are allowed to work leisurely with materials. As the children build with materials (newspaper, clay, sticks, scotch tape, and others) they begin to see the relationship between material, function, and form. By slowly working with a set of various materials, a wide range of experience is provided. Equipment: clay, straws, string, Plasticine, paper, tape, and other; printed matter: teacher's guide.

48. Whistles and Strings (grades 3-6). Whistles and Strings is a unit which allows children to explore rudimentary musical sounds. Starting with pieces of plastic tubes, children can investigate different ways of making sounds from a column of air, and can go on to produce complicated musical instruments

and devices of their own design. With strings, fishline, and pieces of wood, children can work out their own stringed instruments, and can investigate the ways in which sounds made by strings can be altered in pitch, or made more resonant.

N. MATERIALS AVAILABLE FREE: Brochure describing ESS (Introduction to ESS), reprints of several articles, Newsletter which is published irregularly and sent to the mailing list. Upon request, interested institutions, scientists, or educators are added to this mailing list.

O. MATERIALS PURCHASABLE: Price list obtainable from Webster Division, McGraw-Hill Book Company, Manchester Road, Manchester, Missouri.

P. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

Q. LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: Some units have been translated into Spanish and French. Arrangements for translations are made by McGraw-Hill Company.

R. PROJECT IMPLEMENTATION:

1. Number of teachers using materials: In excess of 7,500.
2. Number of students involved: Probably in excess of 225,000.
3. Number of schools involved: Unknown.
4. Sources of totals in 1, 2, and 3 above: Using sales figures received from McGraw-Hill Book Company on sales of class kits for the first 5 ESS units as of January 1968.
5. Name and location of specific schools where course is being taught: Many schools in the following communities are involved in using ESS units developed so far (ESS prefers not to have it called a course since they are not involved in the development of a sequential curriculum): Montgomery County, Maryland; Jefferson County, Colorado; Dixie School District, San Rafael, California; Lompoc, California; Wellesley, Massachusetts; New York, New York; Watertown, Massachusetts; Lexington, Massachusetts; Greece, New York; Cardozo School District, Washington, D.C. among others.
6. Availability of consultants for teachers: Available; regional consultants' names will be provided on request. McGraw-Hill Book Company also has science consultant service.
7. Activities conducted for in-service teacher training: (Not answered).
8. Implementation procedures in addition to above: In-house workshops are held in Newton periodically during academic year; summer workshops for supervisors were held in 1967 and are planned again in 1968.

S. PROJECT EVALUATION:

1. Evaluation conducted by: (Not answered).
2. Instruments used: The persistent feeling has been that traditional evaluative instruments do not measure the most significant aspects of a child's learning and development. In addition, it is believed that the validity of currently

available objective instruments with such a manipulative classroom experience as the materials provide is questionable. Some extension of the case study method of making evaluations will probably be the basis of the research that is done. ESS has now begun to make arrangements with people undertaking research programs to concern themselves with the design of such evaluative instruments for the work.

3. Control groups: In the one formal case study that ESS made with fifth grade classes in Wellesley, Massachusetts ESS worked with two classes at once: one with ESS materials and one with standard science materials assigned to that class. ESS expects to continue to examine parallel groups whenever and however ESS does make the studies.

4. Feedback process: ESS has an extensive feedback process in evaluating the booklets and materials themselves from the point of view of teachers. The primary purpose for this has been to make revisions before commercial release. What ESS has done is provide teachers with a set of materials and ask them to teach the materials. ESS then provides them with detailed questionnaires about the content and format of a particular unit. In addition, ESS visits the classrooms and does anecdotal reports. ESS also interviews the teachers since ESS finds that statements made face-to-face do not always exactly duplicate those which are written down on questionnaires.

5. Research evidence of objectives achieved: The evidence comes from anecdotal reports from teachers and from close and lengthy observations made by the staff is classrooms.

6. Availability of evidence: (Not answered).

7. Other pertinent information: ESS has had the consistent experience that in class groups where there are some children who are non-verbal or otherwise unsuccessful with their day-to-day school work, ESS has made some impact on these children. ESS has evidence that such children begin to read better and, in fact, begin to perform better in many of their other school tasks. ESS attributes this to the change in the child's view of himself--where he has been uniformly unsuccessful he has now had a successful experience in school. He begins to have some sense of his own potential power with other materials as well as these.

T. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: Special emphasis has been given to completing commercial editions of units which have been in development for some time. Five in-house workshops were conducted in Newton for school administrators and other groups. A workshop for science supervisors, curriculum coordinators and professors of science education was conducted for 4 weeks during the summer of 1967 in Newton. Support to schools and school districts who initiated their own workshops in the form of materials and/or staff averaged 4 per month.

U. PLANS FOR THE FUTURE: ESS is curtailing new development in an effort to release commercial editions of work which has been

in development for some time. The fact that science education in elementary schools is not likely to flourish unless it relates more cogently to other areas of the curriculum, specifically reading and arithmetic, requires that ESS not explore these other areas. Problems of teacher training retain a high priority and ESS will explore the use of films, video-tapes and other materials which have promise. Units in early development stages are: Animal Tracks; Astronomy and Applied Optics; Batteries and Bulbs (advanced); Heating and Cooling; Introduction to Lenses; Kites, Boats, Planes, Bridges, and Towers; Melting and Mixing; Mosquitoes; Mushrooms; Orion Book; Primitive Chemistry; Rolling Things; Silk Screen Printing; Snails' and Other Eggs; Stream Tables; Thermometry; Time and Clocks; Water Cells.

A. PROJECT TITLE: ENGINEERING CONCEPTS CURRICULUM PROJECT (ECCP).

B. PROJECT DIRECTORS: Dr. E. E. David, Jr., Bell Telephone Laboratories, Murray Hill, New Jersey 07971. Tel. 201-582-4025. Dr. J.G. Truxal, Polytechnic Institute of Brooklyn, 333 Jay Street, Brooklyn, N.Y., 11201. Tel. 212-643-2164.

C. PROJECT HEADQUARTERS:
1. Contact: Dr. E.J. Piel, Associate Director, ECCP, C/O The Polytechnic Institute of Brooklyn, 333 Jay Street, Brooklyn, N.Y. 11201. Tel. 212-643-5360, ext. 61.
2. Special facilities or activities available for visitor viewing: Sixty schools throughout the United Stated and project headquarters at Polytechnic Institute of Brooklyn.

D. PRINCIPAL PROFESSIONAL STAFF: E.J. Piel, Associate Director; Bernhard A. Sachs, Associate Director; L.S. Hollinger, Staff Assistant; L. Braun, Computer usage; R. Goldgraben, Laboratory.

E. PROJECT SUPPORT:
1. Organizational sponsorships: Commission on Engineering Education; Polytechnic Institute of Brooklyn.
2. Funding agency: National Science Foundation.

F. PROJECT HISTORY:
1. Principal originators: Drs. E.E. David, Jr., and J.G. Truxal.
2. Date and place of initiation: 1964; Polytechnic Institute of Brooklyn.
3. Reason for initiation: Interest in developing course for high school students who do not now study physics.

G. PRESENT COMMERCIAL AFFILIATIONS: American Machine & Foundry Co.; Measurement Control Devices Corp.; McGraw Hill Book Co.; Call-A-Computer.

H. PURPOSES AND OBJECTIVES: The ECCP course, entitled "The Man-Made World", is intended as a part of the cultural curriculum. It is a course for embryo journalists, businessmen, lawyers, medical doctors, executives, teachers, and in fact for all citizens who will take part in guiding the currents of our society. Resources used to create the man-made world are diverse. There are concepts, physical principles, modes of thinking, and the much heralded "scientific method" as well as arts, skills, and inspiration. This course brings these into focus by reference to vital technical accomplishments, but the course also strives to demonstrate the relevance of these resources for biology, economics, sociology, business, communication, psychology, and even the arts and humanities. In emphasizing the utility of precise thought and language the course does not overlook the importance of procedures and techniques for achieving concrete goals, nor the importance of value judgments in deciding "what to do" from the vast number of possibilities. Through this broad approach, the course aims to help students develop insights useful in coping with

social, economic, political as well as purely technical problems.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Laboratory investigations; lectures; seminars; discussion groups; computer as a modeling device; twelve schools using time sharing computers.

J. ORIENTATIONS OF STATED OBJECTIVES: Content mastery; process acquisition; attitudinal changes; scientific literacy; technological literacy.

K. LOCATION OF LIST OF OBJECTIVES: Preface and statement to the students in the text; each chapter in the Teachers Manual.

L. SPECIFIC SUBJECTS, GRADE AND AGE LEVELS: 11th and 12th grades; logic and computers; decision making; feedback control; biomedical engineering concepts.

M. DESCRIPTION OF MATERIALS ALREADY PRODUCED:
1. Text.
2. Teachers Manual.
3. Laboratory Manual.
4. Logic Circuit Board.
5. Analog Computer.
6. Computer Programs.
7. Newsletters - Brochures.

N. MATERIALS AVAILABLE FREE: Item 7 from Engineering Concepts Curriculum Project, Polytechnic Institute of Brooklyn, 333 Jay Street, Brooklyn, N.Y. 11201.

O. MATERIALS PURCHASABLE: From project headquarters: Items 1, 3, and 6, $5.00. From American Machine & Foundry Co., Alexandria, Virginia: Item 4, $60.00; Item 5, $315.00.

P. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

Q. LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: Spanish and Portuguese.

R. PROJECT IMPLEMENTATION:
1. Number of teachers using materials: 63.
2. Number of students involved: 2,209.
3. Number of schools involved: 60.
4. Sources of totals in 1, 2, and 3 above: Actual count.
5. Name and location of specific schools where course is being taught: The following is a partial listing: Monroe Senior High School, Monroe, Wisconsin; Nazareth High School, Brooklyn, N.Y.; New Albany Senior High School, New Albany, Indiana; Needham Broughton High School, Raleigh, North Carolina; Peters Township Jr. Sr. High School, McMurray, Pennsylvania; Melbourne High School, Melbourne, Florida; Nathan Hall High School, Seattle, Washington; Evergreen High School, Evergreen, Colorado; Amherst Regional High School, Amherst, Massachusetts; Lincoln High School, Lincoln, Rhode Island; Golden Senior High School, Golden, Colorado; The Episcopal Academy, Philadelphia, Pennsylvania; Madison East High School, Madison,

Wisconsin; Reagan High School, Houston, Texas; Poway High School, Poway, California; Roy High School, Roy, Utah; Barrington Consolidated High School, Barrington, Illinois; Iolani School, Honolulu, Hawaii; James Caldwell High School, West Caldwell, New Jersey; Jordan Vocational High School, Columbus, Georgia; Severn School, Severna Park, Maryland; East Catholic High School, Detroit, Michigan; Wendell High School, Wendell, Idaho; John Dickinson High School, Wilmington, Delaware; Rawlins High School, Rawlins, Wyoming.

6. Availability of consultants for teachers: Available. There is a university or industry consultant available for each teacher for telephone consultations or school visits. Headquarters personnel are also available.

7. Activities conducted for in-service teacher training: Summer institutes.

8. Implementation procedures in addition to above: Follow-up meetings and school visits.

9. Implementation procedure, seemingly, the most effective: Follow-up sessions and school visits by the project staff.

10. How evaluated: Through interviews and correspondence.

S. PROJECT EVALUATION:

1. Evaluation conducted by: Project staff; The Psychological Corporation.

2. Instruments used: Tests, interviews, written reports from teachers, direct observations, group meetings.

3. Control groups: Yes. Five students from each school who have similar backgrounds, but are not taking the course will take final examination. Scores will be compared with experimental group.

4. Feedback process:

   a. Periodic 2-day group meetings of 7 to 10 teachers. Entire proceedings taped. Tapes made available to authors with a digest of prints covered in meetings.

   b. Class visits with follow-up interviews with teachers and students as well as school administrators and guidance personnel.

5. Research evidence of objectives achieved: Research evidence is being gathered this year.

6. Availability of evidence: Evidence will be available when complete. This will be published as a report in December 1968.

T. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: Revision of text and related materials. Expansion of number of trial schools.

U. PLANS FOR THE FUTURE: Summer institutes 1968 and 1969. In-service institutes 1968-1969. Writing conference at Polytechnic Institute of Brooklyn during summer 1968. Laboratory, film reviewing, teachers manual, testing. Planning conference re future direction of project during summer and fall 1968. Text preliminary edition will be published by August 1968 through McGraw Hill Book Co.; final edition January 1970.

A. PROJECT TITLE: ENVIRONMENTAL SCIENCE CENTER.

B. PROJECT DIRECTOR: Richard J. Myshak, Director, Environmental Science Center, 4800 Glenwood Avenue, Minneapolis, Minnesota 55422. Tel. 612-377-6467.

C. PROJECT HEADQUARTERS:
1. Contact: Richard J. Myshak, Director, Environmental Science Center.
2. Special facilities or activities available for visitor viewing: Laboratory field stations and classroom activities.

D. PRINCIPAL PROFESSIONAL STAFF: Richard J. Myshak, Director; Robert E. Collins, Associate Director and In-Service Director; Barbara B. Clark, Curriculum Director; Michael J. Naylon, Research Director; David G. Jones, Instructional Media Specialist; Karen Littler, Curriculum Assistant.

E. PROJECT SUPPORT:
1. Organizational sponsorship: Golden Valley Independent School District No. 275.
2. Funding agency: U.S. Office of Education.

F. PROJECT HISTORY:
1. Principal originator: Golden Valley Independent School District 275, Robert Johnston, Planning Grant Director.
2. Date and place of initiation: July 1, 1967; Golden Valley Independent District 275.
3. Reason for initiation: See Section H.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PURPOSES AND OBJECTIVES:
1. Provide a comprehensive in-service education program in the biological sciences for all elementary teachers and appropriate secondary teachers in all schools of the metropolitan area. This program will be closely coordinated with;
2. A coordinated program of curriculum development and implementation encompassing the retraining of teachers to speed introduction of innovative programs;
3. Provision of independent study, research, experimentation, and observational opportunities as an integral part of the service center's programs in in-service training and curriculum development;
4. Provide, through the service center's staff, the coordinated utilization in the service center and in the elementary and secondary schools of all potential resources in the metropolitan area for the improvement of teaching and learning in the life sciences;
5. Make a substantial contribution to the understanding of values of natural resources of land, water and air regarding their utilization and preservation for the continued existence of man living in a complex society; and
6. Provide a center for 'non-educational' groups, such as scouts, the Audubon Society, bird clubs, etc., to meet,

conduct programs, and become involved in scientific and esthetic activities.
The center will provide multiple opportunities for students and teachers to engage in the study of environmental biology at ecologically significant study sites operated with the guidance of the project staff. Such sites are currently being identified. They will be utilized by both teachers and students during summer study programs.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study; laboratory investigations; seminars; discussion groups; field investigations; small group instruction involving both students and teachers in micro-teaching situations; evening public information programs.

J. ORIENTATIONS OF STATED OBJECTIVES: Process acquisition; attitudinal changes; scientific literacy; in-service programs will, of necessity, involve some content acquisition as part of the retraining process.

K. LOCATION OF LIST OF OBJECTIVES:
1. Environmental Science Center brochure.
2. Specific instructional objectives appear in background material appropriate for each study unit produced.
3. The Center proposal.
4. Center newsletter Ecologue.

L. SPECIFIC SUBJECTS, GRADE AND AGE LEVELS: Biological and ecological sciences for kindergarten through grade twelve and for elementary and secondary teachers of science.

M. DESCRIPTION OF MATERIALS ALREADY PRODUCED:
1. Center brochure - expanded description of purposes and objectives.
2. Center newsletter - Ecologue contains news of project activities, programs, and publications.
3. Minnows and Models - an instructional unit for upper elementary grades. The unit involves children in the construction of a mathematical model from data gathered in the course of the unit activities. Children observe that a change in water temperature results in a change in fish gill or mouth movements. Data are gathered, plotted, and interpreted. Interpretations are discussed in the light of existing conservation and wildlife management practices.
4. Color and Change - an instructional unit for kindergarten through grade two. Children learn and practice color identification skills. These skills are then employed in investigations of color change in the natural world. Changes in color are viewed as significant biological events related to seasonal differences in climate. School ground field trips provide the focus for outdoor study.
5. Population Variation - an instructional unit for the intermediate elementary grades. The idea that intra-specific variation is the "raw material" of evolution is developed

through activities designed to illustrate various types of population variation. Children, their families, and seeds are the objects of study.
6. Brine Shrimp I - an instructional unit for grades one through three. This unit is designed to involve children in investigations of those environmental variables affecting the hatching and development of brine shrimp eggs. Children each receive eggs and materials for maintaining cultures of shrimp. Investigations are derived from the questions they have about their cultures.
7. Brine Shrimp II - an instructional unit for grades four through six. As in Brine Shrimp I, the focus for investigation is the effect of varying environmental factors upon the behavior of brine shrimp. The basic difference here is the introduction of quantification as a valuable experimental tool. Methods are devised for making accurate population counts; experimental data are gathered, graphed, and discussed.
8. Development of a School Site as an Educational Laboratory - a pamphlet which is to be used as a guide in creating and using school sites as resource areas in the study of environmental science. Teachers are informed of many possible ways to utilize their immediate surroundings including school lawns, trees, shrubs, cracks in sidewalks and black top, mud puddles, and activity fields. Activities suggested are applicable to urban as well as suburban schools.
9. Inquiry: Making Use of Research Activities - a paper for teachers involved in guiding student independent study. The structure of the paper represents one type of research model which can be used as a framework within which to conduct investigations.

N. MATERIALS AVAILABLE FREE: Items 1 and 2 available to all upon request. Items 3 through 9 available to teachers in the geographical area served. Requests from other sources will be considered on an individual basis. Address all requests to the Center.

O. MATERIALS PURCHASABLE: None of the items are purchasable.

P. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

Q. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: No plans.

R. PROJECT IMPLEMENTATION:

1. Number of teachers and students using materials: The implementation program has been initiated but is not yet fully operational. The Center's future implementation program is based upon a two-step plan: 1) involve school districts immediately surrounding the Center site; 2) involve the entire Minneapolis-St. Paul metropolitan area.
2. Availability of consultants for teachers: Consultant help will be provided on a limited basis. Help will be provided for those teaching new materials and for schools desirous of

planning a site survey. (See Section M8).
3. Activities conducted for in-service teacher training: Three in-service programs each of varying duration will be conducted this spring. A five week course for six hours of college credit will be offered in the summer. The emphasis in all programs will be to acquaint the teacher with the outdoors as a resource for elementary school life science.
4. Implementation procedures in addition to above: The Center has appointed a curriculum in-service advisory committee made up of teachers and administrators whose function it is to provide liaison between the project and cooperating school districts. These individuals will oversee the process of implementation in their respective districts.
5. Implementation procedure, seemingly, the most effective: Since broad scale implementation has not begun, it is too early to assess effectiveness.

S. PROJECT EVALUATION:
1. Evaluation conducted by: Center staff.
2. Instruments used: Feedback forms to be used with early trial editions of instructional units. Unit revisions will be based in part upon the results of trials.
3. Control groups: None used.
4. Feedback process: Anecdotal feedback forms.
5. Research evidence of objectives achieved: None at this time.
6. Availability of evidence: Any evidence forthcoming would be available.

T. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: (Not previously reported).

U. PLANS FOR THE FUTURE:
1. Expand in-service programs to include training with federal project materials.
2. Develop independent study programs for secondary school students and teachers.
3. Serve as a use coordinator of the many field sites and programs now available in the Minneapolis-St. Paul metropolitan area. This is being done by request of the many groups now actively involved in outdoor education programs.

A. PROJECT TITLE: ERC SCIENCE PROGRAM.

B. PROJECT DIRECTOR: Dr. Ted F. Andrews, Director of Science, #312 Rockefeller Building, 614 West Superior Avenue, Cleveland, Ohio 44113. Tel. 216-696-8222, ext. 261.

C. PROJECT HEADQUARTERS:
1. Contact: Dr. Ted F. Andrews, Director of Science, Educational Research Council of America.
2. Special facilities or activities available for visitor viewing: Offices and demonstration laboratories at the project headquarters.

D. PRINCIPAL PROFESSIONAL STAFF: Ted F. Andrews, Director of Science; Roger W. Bodley, Research Assistant; Joseph M. Egar, Research Associate; Robert E. Eland, Science Assistant; James J. Gallagher, Research Associate; Claude W. Gatewood, Research Associate; Robert C. Goodman, Research Assistant; Daniel D. Itschner, Field Assistant; Willard W. Korth, Research Associate; Terence P. McGannon, Science Assistant; Elinor T. Parish, Field Assistant; Fred A. Rasmussen, Research Assistant; Vivien F. Raunegger, Science Illustrator; Betty J. Schaffer, Administrative Assistant; Victor M. Showalter, Research Assistant; Sr. Mary Clare Jerdonek, V.S.C., Research Assistant; Ted E. Surdy, Research Associate.

E. PROJECT SUPPORT:
1. Organizational sponsorship: Educational Research Council of America.
2. Funding agency: None particularly designated for Science Program.

F. PROJECT HISTORY:
1. Principal originators: George H. Baird, Executive Director of ERC, and Ted F. Andrews.
2. Date and place of initiation: 1966; Cleveland, Ohio.
3. Reason for initiation: Science curriculum research and development, grades K-12.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PURPOSES AND OBJECTIVES: Develop an interdisciplinary, sequential science curriculum for all educable students from kindergarten through grade twelve.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study, programmed instruction, laboratory investigations, audio-tutorial, individualized pacing.

J. ORIENTATIONS OF STATED OBJECTIVES: Content mastery, process acquisition, attitudinal changes, scientific literacy, interfaces of science with math, technology, social science, and humanities.

K. LOCATION OF LIST OF OBJECTIVES: Specific objectives are detailed in the teacher guide materials in the ERC - produced science courses. General objectives are also described in course

content overviews.

L. SPECIFIC SUBJECTS, GRADE AND AGE LEVELS: Science, grades K through 12.

M. DESCRIPTION OF MATERIALS ALREADY PRODUCED:
1. ERC LIFE SCIENCE, Second Experimental Edition (for grade seven). The program is man-centered, stressing inquiry approach in laboratory investigations of problems concerning man and his environment. Student Investigations, in four volumes. Instructional Guide, in four volumes: Topic I: Variation; Topic II: Characteristics of Living Things; Topic III: The Role of Living Things; Topic IV: Man's Effect on the Environment. Fly Facts (a supplementary informational booklet on raising houseflies for classroom use.)
2. ERC SCIENCE PROBLEMS, First Experimental Edition (for grades 11, 12). Planned to meet the needs of students who do not take physics and chemistry; the materials are organized in three phases: Phase I, Heartbeat Problems are teacher-directed; Phase II, Pendulum Problems, are transitional; Phase III, Problem Areas, are designed for self-pacing, individual investigation by the students. Phases I and II: Teacher Guide to Heartbeat and Pendulum Problems; Student Guide to Heartbeat and Pendulum Problems; Student Test Packet; Heartbeat Resource Book; Pendulum Resource Book; Flowcharting. Phase III Problem Areas (Now available): Chromatography; Measuring Stars; Electricity; Slotcar Science; Chemical Analysis. Phase III Problem Areas (Available by fall 1968): Hair Research; Map Making; Photography; Survival; Water Pollution. Each Problem Area includes the following materials: Resource Book; Student Guide Cards; Checkpoint Tests; Teacher Guide Packet.
3. ERC Science News, a newsletter published bi-monthly from October through June, describing current activities of the ERC Science Program, and providing information to science teachers about new developments in science and in other curriculum projects.
4. Testing Instruments for evaluating student attitudes and knowledge of science processes.
5. The ERC Science Program, a brochure describing the goals and philosophy of the program.

N. MATERIALS AVAILABLE FREE: ERC LIFE SCIENCE Prospectus; ERC SCIENCE PROBLEMS Prospectus; ERC Science News is free to persons associated with the Council participating school systems; the ERC Science Program brochure, and sample copies of the newsletter, working papers, and other information is available upon request. Direct all requests for information and materials to the Director of Science, Educational Research Council of America, Rockefeller Building, Cleveland, Ohio 44113.

O. MATERIALS PURCHASABLE: Item 1, ERC LIFE SCIENCE: Student Investigations, four volumes, $16.00; Instructional Guide,

four volumes, $5.00. These materials are available only in complete sets of four volumes. The Student Investigations materials are interleaved throughout the Instructional Guide, in addition to being bound separately for the student. Fly Facts, per copy, $0.60. Item 2, ERC SCIENCE PROBLEMS materials are available in Sample Sets, and Classroom Sets are available on a limited basis: Sample Set, $25.00; Classroom Set (for 30 students), $385.00. Item 3, ERC Science News, subscription for one year (five issues), $2.25. Direct all requests for information and materials to the Director of Science, Educational Research Council of America, Rockefeller Building, Cleveland, Ohio 44113.

P. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

Q. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: None.

R. PROJECT IMPLEMENTATION:

1. Number of teachers using materials: 61.
2. Number of students involved: 3,606.
3. Number of schools involved: 35.
4. Sources of totals in 1, 2, and 3 above: Actual count.
5. Name and location of specific schools where course is being taught: The following is a partial list. ERC SCIENCE PROBLEMS: Aurora High School, Aurora, Ohio; Bay Village High School, Bay Village, Ohio; Brockton High School, Brockton, Massachusetts; Cuyahoga Heights High School, Cleveland, Ohio; Niles Senior High School, Niles, Michigan; Foston High School, Foston, Minnesota. ERC LIFE SCIENCE: Roehm Jr. High School, Berea, Ohio; School Street Jr. High School, Bradford, Pennsylvania; West Jr. High School, Brockton, Massachusetts; Cuyahoga Heights High School, Cleveland, Ohio; Ballard Jr. High School, Niles, Michigan; Hithergreen Middle School, Dayton, Ohio; Tower Heights Middle School, Centerville, Ohio; Steele Jr. High School, Muskegon, Michigan.
6. Availability of consultants for teachers: Available upon request of teacher or administrator in any school using materials, ERC science staff will visit classes and/or consult with school personnel, either at the school site or in the Council offices. Also, the Council maintains a telephone conference communications system which is open to participating schools at all times for consulting with Council staff, in groups, or on an individual basis.
7. Activities conducted for in-service teacher training: Orientation workshop sessions are held in the summer to train teachers who plan to use the materials in their fall classes. Regular meetings are held throughout the school year to allow teachers who are using the materials to share ideas and problems and to discuss plans for the upcoming lessons. Seminars are held at various intervals during the school year, using the conference telephone system, to discuss specific aspects of the goals of the program. Feedback

from all these meetings is collected for use in revisions of the materials.
8. Implementation procedures in addition to above: None.
9. Implementation procedure, seemingly, the most effective: Working regularly in the classroom with teachers who are trying out the experimental materials.
10. How evaluated: By direct observation and by evaluation instruments.

S. PROJECT EVALUATION:
1. Evaluation conducted by: Members of the ERC Science Staff.
2. Instruments used: Attitude and processes tests and other special instruments are being developed for use with these materials by members of the ERC Science Staff.
3. Control groups: None used as yet.
4. Feedback process: Direct visits with students and teachers in the classroom, formal questionnaires, and video-tape recording.
5. Research evidence of objectives achieved: Too early to tell.
6. Availability of evidence: Evidence will be available.

T. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: (Not previously reported.)

U. PLANS FOR THE FUTURE: Develop a science curriculum design for use as a guide in producing a K-12 interdisciplinary science program.

A. PROJECT TITLE: FLINT HILLS ELEMENTARY SCIENCE PROGRAM DEVELOPMENT PROJECT.

B. PROJECT DIRECTOR: Gerald L. Abegg, Kansas State Teachers College, Emporia, Kansas 66801. Tel. 316-DI 2-1342.

C. PROJECT HEADQUARTERS:
1. Contact: Gerald L. Abegg, Project Director, Flint Hills Elementary Science Program Development Project.
2. Special facilities or activities available for visitor viewing: A center for in-service education of teachers has been established on the KSTC campus. It is open to visitors.

D. PRINCIPAL PROFESSIONAL STAFF: Gerald L. Abegg, Project Director; Glenn H. Crumb, Research Coordinator; Herbert N. Simmons, Elementary Science Specialist.

E. PROJECT SUPPORT:
1. Organizational sponsorship: Flint Hills Educational Research and Development Association (an organization of 13 Unified School Districts in a 7-county area).
2. Funding agency: Title III, U.S. Office of Education.

F. PROJECT HISTORY:
1. Principal originators: Gerald L. Abegg and Glenn H. Crumb.
2. Date and place of initiation: June 1, 1966; Flint Hills Association, Emporia, Kansas.
3. Reason for initiation: To improve the science programs and instruction in the 60 elementary schools of the association.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PURPOSES AND OBJECTIVES: To develop a system of exemplary instructional programs in science; to develop a program of studies for the upper elementary (6, 7, 8) grades in a seven-county rural area; to provide teachers in these schools with: consultant services, subject matter training, and assistance in developing a coherent modern program of studies in science; to establish communication between teachers, science educators, curriculum developers and scientists.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Laboratory investigations, seminars, discussion groups.

J. ORIENTATIONS OF STATED OBJECTIVES: Process acquisition, attitudinal changes, scientific literacy.

K. LOCATION OF LIST OF OBJECTIVES: In the staff's proposal to the USOE, which identifies the specific objectives.

L. SPECIFIC SUBJECTS, GRADE AND AGE LEVELS: All science areas in grades 6 through 8.

M. DESCRIPTION OF MATERIALS ALREADY PRODUCED:
1. Field Guide to Geology of East Central Kansas.
2. General Information Pamphlet.
3. Field Guide to Geology of Kansas.

4. Kodachrome slide set of Geology of Kansas.
5. Guide for Implementation.

N. MATERIALS AVAILABLE FREE: Item 2 from address in Section C.

O. MATERIALS PURCHASABLE: Item 1, $1.00; Item 3, $1.00; Item 4, $7.00. Price includes mailing and handling, address in Section C above.

P. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

Q. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: None.

R. PROJECT IMPLEMENTATION:
1. Number of teachers using materials: 150.
2. Number of students involved: 4,000.
3. Number of schools involved: 60.
4. Sources of totals in 1, 2, and 3 above: Selected teachers in grades 6, 7, or 8 from each of the 51 schools in the project.
5. Name and location of specific schools where course is being taught: All of the elementary schools in the thirteen school districts located in Chase, Coffey, Greenwood, Lyon, Morris, Osage, and Wabaunsee Counties of east central Kansas.
6. Availability of consultants for teachers: The project staff and some college personnel visit classrooms, advise on facilities, conduct evaluation and consult on matters of concern to a teacher or district.
7. Activities conducted for in-service teacher training: Workshops are conducted in each school utilizing the project staff and the 60 key teachers trained in the summer workshops.
8. Implementation procedures in addition to above: A large library of instructional materials is made available to all teachers in the schools. These materials are delivered to the respective school by the project staff who provide assistance in using them.
9. Implementation procedure, seemingly, the most effective: The materials distribution because none of these schools have had any extensive amount of instructional material in science.
10. How evaluated: Questionnaires were sent to teachers, principals, and superintendents.

S. PROJECT EVALUATION:
1. Evaluation conducted by: Dr. Glenn H. Crumb.
2. Instruments used: STEP Science Test Form 4A and 3A; TOUS Form Ew; OTIS Mental Abilities Test.
3. Control groups: Yes, chosen because of similarity of school and communities to those in this project.
4. Feedback process: Six workshops are held during the school year for the teachers to analyze the effectiveness of the materials utilized.
5. Research evidence of objectives achieved: Analysis of student data obtained from the administration of the instrument noted above indicates that the project group made

significantly greater gains in test scores than did the control group.
6. Availability of evidence: Available through direct correspondence with project director.

T. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: Second Summer Workshop emphasizing Earth Science was held in July 1967. A field trip to study the geology of the region and state of Kansas resulted in the publication of a booklet.

U. PLANS FOR THE FUTURE: The third summer program will concentrate on the Biological Sciences. Guides for the extended implementation and long range utilization of the project will be developed for the phase out following the termination of the grant in June 1969.

A. PROJECT TITLE: 1965-66 GENERAL MATHEMATICS I & II WRITING PROJECT.

B. PROJECT DIRECTOR: Mr. George Hudson, Albuquerque Public Schools, P.O. Box 1927, Albuquerque, New Mexico 87103. Tel. 842-3656.

C. PROJECT HEADQUARTERS:
1. Contact: Mr. George Hudson, Consultant, 1965-66 General Mathematics I & II Writing Project, Secondary School Mathematics.
2. Special facilities or activities available for visitor viewing: Classroom use of numerous teacher-written units in General Mathematics I and II.

D. PRINCIPAL PROFESSIONAL STAFF: Director: George Hudson, Consultant, Secondary School Mathematics. 9th & 10th Grade Instructors: Sidney Humble, Grant JHS; Beneranda Mora, Rio Grande HS. 11th & 12th Grade Instructors: Geneva Ellis, West Mesa HS; Charles Burdick, Valley HS.

E. PROJECT SUPPORT:
1. Organizational sponsorship: Albuquerque Public Schools.
2. Funding agency: Title I of Elementary-Secondary Education Act.

F. PROJECT HISTORY:
1. Principal originators: Consultant and instructors of secondary school mathematics, Albuquerque Public Schools.
2. Date and place of initiation: January 1, 1965; Albuquerque, New Mexico.
3. Reason for initiation: Scarcity of interesting and appropriate mathematics materials for use with less-able grade 9-12 pupils.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PURPOSES AND OBJECTIVES: Specific objective - preparation of mathematically sound, updated content of a difficulty level appropriate for use with less-able high school pupils. Unique characteristic - units were written by instructors who had been teaching the general mathematics pupils with whom the content was to be used in 1965-66 and 1966-67.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study, lectures, discussion groups.

J. ORIENTATIONS OF STATED OBJECTIVES: Content mastery, process acquisition, attitudinal changes.

K. LOCATION OF LIST OF OBJECTIVES: Not listed in the material.

L. SPECIFIC SUBJECTS, GRADE AND AGE LEVELS: General Math I & II, grades 9-12, age level 14-18 years.

M. DESCRIPTION OF MATERIALS ALREADY PRODUCED: A unified group of approximately 600 pages in each of General Math I and II. This is content for study by pupil. Pages are punched for loose-leaf binder and are collated and stapled by units.

N. MATERIALS AVAILABLE FREE: One copy of surplus units is available upon request.

O. MATERIALS PURCHASABLE: Not yet available.

P. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

Q. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: No translation plans.

R. PROJECT IMPLEMENTATION:

1. Number of teachers using materials: 40.
2. Number of students involved: 2,000.
3. Number of schools involved: 30.
4. Sources of totals in 1, 2, and 3 above: By counting them.
5. Name and location of specific schools where course is being taught: Grant JHS, Rio Grande HS, Valley HS, West Mesa HS.
6. Availability of consultants for teachers: A consultant is available to teachers at all times.
7. Activities conducted for in-service teacher training: In-service teacher training is offered in individual schools by experienced master teachers.
8. Implementation procedures in addition to above: None.

S. PROJECT EVALUATION:

1. Evaluation conducted by: Julianne Papcsy, Research Psychologist.
2. Instruments used: California Arithmetic - Form Y.
3. Control groups: Yes.
4. Feedback process: Each unit is accompanied by a rating sheet. Individual instructors complete and return rating sheet to Consultant who tabulates responses for systemwide performance picture.
5. Research evidence of objectives achieved: Unit rating-sheets indicate: (1) Improved pupil attitude; (2) Teacher opinion that difficulty of content can be increased for use in schools attended by culturally-advantaged general math pupils.
6. Availability of evidence: Available on request.

T. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: Forty pages of supplementary problems were written and published. Some minor corrections and revisions were made to the present units.

U. PLANS FOR THE FUTURE: Plans are underway for a major revision by 1970.

A. PROJECT TITLE: GRAND RAPIDS MATHEMATICS LABORATORY PROJECT.

B. PROJECT DIRECTOR: Lauren G. Woodby, Mathematics Department, Michigan State University, East Lansing, Michigan 48823. Tel. 517-355-1725.

C. PROJECT HEADQUARTERS:
1. Contact: Prof. Lauren G. Woodby, Grand Rapids Mathematics Laboratory Project, Michigan State University.
2. Address: Turner School, 959 Turner Street, Grand Rapids, Michigan. Tel. 616-456-4830.
3. Special facilities or activities available for visitor viewing: Laboratory materials at Turner School.

D. PRINCIPAL PROFESSIONAL STAFF: Lauren G. Woodby, Director; Irvin Vance, Assistant Professor; Ann White, Coordinator.

E. PROJECT SUPPORT:
1. Organizational sponsorships: Grand Rapids Public Schools; Michigan State University.
2. Funding agency: National Science Foundation.

F. PROJECT HISTORY:
1. Principal originators: Dr. Lauren G. Woodby; Dr. Joseph McMillan.
2. Date and place of initiation: August 1967; Turner School, Grand Rapids, Michigan.
3. Reason for initiation: Improve mathematics teaching in inner city middle schools, and as a followup to the Cleveland Mathematics Laboratory Pilot Project.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PURPOSES AND OBJECTIVES: To train teachers in the use of a laboratory-discovery approach to learning mathematics.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study; laboratory investigations; seminars; discussion groups.

J. ORIENTATIONS OF STATED OBJECTIVES: Content mastery; process acquisition; attitudinal changes.

K. LOCATION OF LIST OF OBJECTIVES: (Not answered).

L. SPECIFIC SUBJECTS, GRADE AND AGE LEVELS: Mathematics, principally in grades 5-8.

M. DESCRIPTION OF MATERIALS ALREADY PRODUCED:
1. Teacher-made laboratory worksheets.
2. Pupil-made geoboards, models, puzzles.

N. MATERIALS AVAILABLE FREE: None.

O. MATERIALS PURCHASABLE: None.

P. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

Q. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: None.

R. PROJECT IMPLEMENTATION:

1. Number of teachers using materials: 38.
2. Number of students involved: 800.
3. Number of schools involved: (Not answered).
4. Sources of totals in 1, 2, and 3 above: (Not answered).
5. Name and location of specific schools where course is being taught: Grand Rapids Public Schools.
6. Availability of consultants for teachers: Available; one day each week, two consultants visit different classrooms from 2 to 5.
7. Activities conducted for in-service teacher training: Entire program is for in-service teacher training.
8. Implementation procedures in addition to above: Special weekend mathematics laboratory retreat in October.
9. Implementation procedure, seemingly, the most effective: Visits of consultants to classrooms.
10. How evaluated: Informally.

S. PROJECT EVALUATION:
1. Evaluation conducted by: Dr. Phillip Merrifield, Kent State University.
2. Instruments used: Three attitude tests developed by Dr. Merrifield.
3. Control groups: None used.
4. Feedback process: Group interaction in weekly seminars.
5. Research evidence of objectives achieved: None.

T. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: (Not previously reported).

U. PLANS FOR THE FUTURE: None.

A. PROJECT TITLE: THE GREATER CLEVELAND MATHEMATICS PROGRAM OF THE EDUCATIONAL RESEARCH COUNCIL OF AMERICA (GCMP).

B. PROJECT DIRECTOR: Mr. John F. Mehegan, Educational Research Council of America, Rockefeller Building, 614 Superior NW, Cleveland, Ohio 44113. Tel. 216-696-8222.

C. PROJECT HEADQUARTERS:
1. Contact: Mr. John F. Mehegan, Director GCMP.
2. Special facilities or activities available for visitor viewing: Classes in participating schools.

D. PRINCIPAL PROFESSIONAL STAFF: John F. Mehegan, Director; William T. Hale, Assistant Director; Ronald P. Fisher, Research Associate, Elementary Coordinator; S. Edwin Humiston, Research Associate, Secondary Coordinator; Lucille McCraith, Research Associate; Thomas C. O'Brien, Research Associate; Rae Marie Parsons, Research Associate; Margaret Russell, Research Associate; Judy Klein, Research Assistant; Stephen L. Merkel, Research Assistant; Richard Parker, Research Assistant; Juris Raudins, Research Assistant; Barrett Robinson, Research Assistant; Sharon Thompson, Research Assistant; Susan Williams, Editorial Assistant; Youssef Yomtoob, Research Assistant; Max Beberman, Consultant; Charles Buck, Consultant; George S. Cunningham, Consultant; Jack E. Forbes, Consultant; John G. Kemeny, Consultant; George Polya, Consultant; Paul Rosenbloom, Consultant; Harry Ruderman, Consultant.

E. PROJECT SUPPORT:
1. Organizational sponsorship: Educational Research Council of America.
2. Funding agencies: Cleveland Foundation; Grant Foundation; Martha Holden Jennings Foundation; Charles F. Kettering Foundation; Lubrizol Foundation; and others.

F. PROJECT HISTORY:
1. Principal originator: Dr. George Baird, President Educational Research Council.
2. Date and place of initiation: March, 1959; Cleveland, Ohio.
3. Reason for initiation: Request of participating school superintendents to improve mathematics curriculum for grades K-12.

G. PRESENT COMMERCIAL AFFILIATIONS: Some of the materials are published by Science Research Associates, Inc., in Chicago, Illinois.

H. PURPOSES AND OBJECTIVES: To develop a comprehensive, sequential mathematics program for all children in grades kindergarten through twelve, a program which is both mathematically correct and pedagogically sound.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study, laboratory investigations, lectures, seminars, discussion groups, computer assisted instruction, films.

J. ORIENTATIONS OF STATED OBJECTIVES: Content mastery, process acquisition, attitudinal changes, scientific literacy.

K. LOCATION OF LIST OF OBJECTIVES: "Greater Cleveland Mathematics Program" (see M6).

L. SPECIFIC SUBJECTS, GRADE AND AGE LEVELS: Kindergarten - sixth grade (elementary); pre-algebra and geometry (secondary).

M. DESCRIPTION OF MATERIALS ALREADY PRODUCED:

1. Kindergarten Work Sheets and Teacher Guide, Volume 1 and 2.
2. Primary Series Grades 1-3 Pupil Books and Teacher Guides.
3. Intermediate Series Grades 4-6 Pupil Books and Teacher Guides.
4. Pre-Algebra Program: 101, 102A, 102B, 103, 201 Teacher Guides and Pupil Books; Looping Books, J1, J2, J3, F1, F2, F3, FJ4, N1, N2, N3, P1, P2, P3, G1, G2, G3 - Teacher Guides and Pupil Books.
5. GCMP Geometry (Books 1-4 with Teacher Guides).
6. Bulletins: "What Good Teaching Does;" "Have You Done Your Homework?;" "Greater Cleveland Mathematics Program;" "GCMP Geometry;" "GCMP Pre-Algebra Program".

N. MATERIALS AVAILABLE FREE: From Item 6: "Greater Cleveland Mathematics Program," "GCMP Geometry", and "GCMP Pre-Algebra" brochures.

O. MATERIALS PURCHASABLE: Items 1, 2, and 3 from Science Research Associates. Item 4, Pre-Algebra materials available only to Council Member Schools. Item 5, GCMP Geometry - Educational Research Council, Student Books (Set of 4 books $6.00 or $1.50 each) Teacher Guides (Set of 4 $15.00 or $3.75 each). Item 6, "What Good Teaching Does" $.50 and "Have You Done Your Homework?" $.50. Available from Educational Research Council.

P. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

Q. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: (Not answered).

R. PROJECT IMPLEMENTATION:

1. Number of teachers using materials: 104 (In Council Schools).
2. Number of students involved: 64,773 (In Council Schools).
3. Number of schools involved: 142 (Council Schools).
4. Sources of totals in 1, 2, and 3 above: Memberships in Educational Research Council of America.
5. Name and location of specific schools where course is being taught: State of Ohio: Aurora; Avon Lake; Bay Village; Berea; Brooklyn; Cleveland Catholic Schools; Chardon; Cuyahoga Heights; Fairview Park; Independence; Wickliffe; Lakewood; Laurel School; Cleveland Lutheran Schools; Mayfield; North Olmsted; Olmsted Falls; Rocky River; Springfield; University School; Washington Township; Westlake. Outside State of Ohio: Bradford, Pennsylvania; Brockton, Massachusetts; Muskegon, Michigan; Niles, Michigan; Owatonna, Minnesota; Summit, New Jersey.

6. Availability of consultants for teachers: Field service, in-service, and consultant service.
7. Activities conducted for in-service teacher training: Summer Conference (1-week with 30 hours orientation instruction for new teacher); provide visitation to schools, consultant and demonstration lessons during school year.
8. Implementation procedures in addition to above: (Not answered).
9. Implementation procedure, seemingly, the most effective: Field service, consultant and demonstration lessons in schools.
10. How evaluated: Materials used in Council schools with centralized testing and individual school testing. Field work with observations, teacher conferences, direct teacher feedback is also used and clinical studies in depth of pupil growth and development in mathematics.

S. PROJECT EVALUATION:
1. Evaluation conducted by: GCMP and ERC Testing Department.
2. Instruments used: Tests written by ERC Testing Dept. and GCMP Staff Members.
3. Control groups: (Not answered).
4. Feedback process: Staff visits to schools and conference visits with groups of teachers.
5. Research evidence of objectives achieved: Results have been tabulated by Testing Department of ERC.
6. Availability of evidence: Not available.

T. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: Major revision of K-6 was undertaken this year as of 7-1-67. It will be ready for use in the schools September, 1968 (Printed by SRA). A complete set of looping books and teacher guides for the Pre-Algebra Program were written and are in Council schools now. A program for "slow-learners" in geometry was started this summer and is now being developed.

U. PLANS FOR THE FUTURE: Extensive experimental use with various teaching aids. More field work in Council Schools, development of a program for "slow learners" in the high school. In the high school program the staff plans to teach algebra and geometry simultaneously. The staff will one day have a computer center at ERC which the Council schools will use on a time-sharing basis. The staff is developing more films for teacher training.

A. PROJECT TITLE: HARVARD PROJECT PHYSICS (HPP).

B. PROJECT DIRECTOR: Executive Director: Dr. F. James Rutherford, Harvard Project Physics, Pierce Hall - G2, Cambridge, Massachusetts 02138. Tel. UN8-7600, ext. 3281. Project Co-directors: Dr. Gerald Holton, Dr. F. James Rutherford, Dr. Fletcher Watson.

C. PROJECT HEADQUARTERS:
1. Contact: Dr. F. James Rutherford, HPP.
2. Special facilities or activities available for visitor viewing: Conference room in which copies of the materials (printed materials, laboratory apparatus, film loops, overhead transparencies, etc.) can be studied.

D. PRINCIPAL PROFESSIONAL STAFF: Project Co-directors: F. James Rutherford, Gerald Holton, Fletcher Watson; Andrew Ahlgren, Alfred Bork, Stephen Brush, John Harris, Robert Lillich, Noel Little, Glen Mervyn, James Minstrell, James Reid, Arthur Rothman, Albert Steward, Robert Sullivan, Lloyd Swenson, Herbert Walberg, Wayne Welch.

E. PROJECT SUPPORT:
1. Organizational sponsorship: Harvard Graduate School of Education.
2. Funding agencies: Carnegie Corporation of New York; the Ford Foundation; National Science Foundation; Alfred P. Sloan Foundation; U.S. Office of Education.

F. PROJECT HISTORY:
1. Principal originators: Gerald Holton, F. James Rutherford, Fletcher G. Watson.
2. Date and place of initiation: July 1964; Cambridge, Massachusetts.
3. Reason for initiation: Concern for the small and decreasing enrollment in physics at all levels plus a feeling that there ought to be available to students at least one general education version of a sound physics course.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PURPOSES AND OBJECTIVES:
1. Presentation of physics in a broad, humanistic context. Try to show connection between physics and man's other intellectual, artistic and social activities.
2. Design into the course the maximum flexibility with regard to context, emphasis, and teaching strategies. This involves considerable change in the prevailing notions about the role of the teacher in science learning.
3. To increase in numbers and in diversity of ability and interests the population of students who take an introductory physics course.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study, programmed instruction, laboratory investigations, seminars, discussion groups, computer assisted instruction, multimedia

systems approach.

J. ORIENTATIONS OF STATED OBJECTIVES: Content mastery, process acquisition, attitudinal changes, scientific literacy, career guidance.

K. LOCATION OF LIST OF OBJECTIVES: Newsletters; Progress Report in May issue of The Physics Teacher.

L. SPECIFIC SUBJECTS, GRADE AND AGE LEVELS: Introductory physics course for high school and junior college students.

M. DESCRIPTION OF MATERIALS ALREADY PRODUCED:
1. 6 basic text units.
2. 6 teacher guides.
3. 6 physics readers.
4. 6 student handbooks.
5. Laboratory and demonstration apparatus.
6. Overhead transparencies.
7. Film loops and film strips.
8. Test booklets.
9. Supplementary units.
10. Programmed instruction booklets.
11. Newsletter.

N. MATERIALS AVAILABLE FREE: Newsletters; reprinted of May, 1967 The Physics Teacher.

O. MATERIALS PURCHASABLE: None, at present.

P. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

Q. LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: None yet, but eventually there will be translations.

R. PROJECT IMPLEMENTATION:
1. Number of teachers using materials: 110.
2. Number of students involved: 6,522.
3. Number of schools involved: 110.
4. Sources of totals in 1, 2, and 3 above: (Not answered).
5. Name and location of specific schools where course is being taught: The following is a partial listing: Newton South High School, Newton, Mass.; McEachern High School, Powder Springs, Georgia; Interlochen Arts Academy, Interlochen, Michigan; Oak Ridge High School, Oak Ridge, Tennessee; Lowell High School, Whittier, California.
6. Availability of consultants for teachers: Not available yet. Hopefully for 1969-70.
7. Activities conducted for in-service teacher training: Project works with Directors of Project Physics/NSF summer, in-service and academic year institutes and of Cooperative College School Science programs.
8. Implementation procedures in addition to above: Attend teachers meetings and workshops. Work with local school districts to introduce Project systematically. Other plans being considered for support by USOE and NSF.

9. Implementation procedure, seemingly, the most effective: Too early to tell.

S. PROJECT EVALUATION:

1. Evaluation conducted by: Wayne W. Welch and Herbert J. Walberg of the Project staff have assumed continuing responsibility for the Project evaluation. At various times Andrew Ahlgren, Gary T. Anderson, Robert Bridgham, Fred Geis, Jr., Arthur I. Rothman, F. James Rutherford, and Fletcher G. Watson have also worked on evaluation activities.
2. Instruments used: A series of tests and questionnaires designed or selected to help describe teachers and students and to detect changes that may result from a one-year study of physics.
3. Control groups: During 1967-68 the staff is working with three different groups of teachers: a group of 57 teachers was randomly selected from the national population of physics teachers and randomly assigned to experimental and control groups; 36 in the experimental group and 21 in the control group. Also, 21 teachers in their second year of teaching the course are participating in the evaluation. Thus, 78 teachers and approximately 4,000 students are involved.
4. Feedback process: Feedback information has been obtained from both teachers and students during the past three years. Currently, information is sent back to the Project, and telephone calls are made periodically to the new teachers on the Project. One large feedback session is being held to obtain information on the success of the course in the randomly selected schools.
5. Research evidence of objectives achieved: The trial evaluation year of 1966-67 was primarily a test of the experimental design, randomized data collection procedures and the measuring instruments. Since the course was not in final form and could not be evaluated definitively, a number of basic research studies were carried out to determine the effect of teacher, student, and classroom climate variables upon course outcomes. These findings will be used to guide the evaluation studies of the current year. Other studies have been carried out to investigate such factors as creativity, need for achievement, reading and study habits of science students, and research methodology. However, several investigations have been made that indicate some course objectives have been achieved. For example, the staff has found 1) a 37% annual increase in enrollment in physics in schools using Project materials, 2) that students recruited into physics did as well as regular students, 3) that girls achieve as well as or slightly better than boys, and 4) that the readability and length of the text seems appropriate for the target audience. Additional studies will be carried out on data obtained from the national random sampling of 1967-68 and all results eventually will be gathered together in a bound document.

6. Availability of evidence: See Newsletter #6 and bibliography of research papers (available from Project Headquarters).
7. Other pertinent information: In addition to the papers cited in the bibliography, presentations have been made at the NARST, AERA, and NSTA national conventions during the past three years.

T. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: See Newsletters.

U. PLANS FOR THE FUTURE: See Newsletters.

A. PROJECT TITLE: HIGH SCHOOL FOR ONE.

B. PROJECT DIRECTOR: Dr. Chester Hausken, Northwest Regional Educational Laboratory, 710 S.W. 2nd Avenue, Portland, Oregon 97204. Tel. 503-224-3650, ext. 48.

C. PROJECT HEADQUARTERS:
1. Contact: Dr. Chester Hausken, High School For One, Northwest Regional Educational Laboratory.
2. Address: Dr. Arnold Gallegos, Washington State University, Pullman, Washington 99163. Tel. 335-4966.
3. Special facilities or activities available for visitor viewing: Field test schools in 5 states.

D. PRINCIPAL PROFESSIONAL STAFF: Arnold Gallegos, Project Director; Chester Hausken, Coordinator, Program 400; Ray Jongeward, Research Director; Walt Hartenberger, Staff Specialist.

E. PROJECT SUPPORT:
1. Organizational sponsorships: Washington State University, Northwest Regional Educational Laboratory.
2. Funding agencies: Title II and Title IV, ESEA.

F. PROJECT HISTORY:
1. Principal originator: Dr. Herbert Hite, Washington State University.
2. Date and place of initiation: Summer 1966; Washington State University.
3. Reason for initiation: Problems in small schools.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PURPOSES AND OBJECTIVES: To improve the quality and quantity of education for youth in rural, isolated high schools in the Northwest region by developing, field testing, evaluating and demonstrating, in cooperation with agencies and organizations, self-instructional, multi-media systems of instruction in several subject matter fields.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Self-instructional materials.

J. ORIENTATIONS OF STATED OBJECTIVES: Content mastery.

K. LOCATION OF LIST OF OBJECTIVES: At the start, they are behavioral in nature.

L. SPECIFIC SUBJECTS, GRADE AND AGE LEVELS: Physical science, grades 8-9; mathematics, grades 11-12.

M. DESCRIPTION OF MATERIALS ALREADY PRODUCED:
1. Physical Science - self instructional materials that are polysensory about one semester long.
2. Mathematics - polysensory self-instructional advanced, grade 12.

N. MATERIALS AVAILABLE FREE: None.

O. MATERIALS PURCHASABLE: None (in field testing stage at Anatone,

Washington, January 1968).

P. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

Q. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: No plans.

R. PROJECT IMPLEMENTATION:
1. Number of teachers using materials: 3.
2. Number of students involved: 30.
3. Number of schools involved: 1 (1st stage of development).
4. Sources of totals in 1, 2, and 3 above: One school, all students, grades 9-12.
5. Name and location of specific schools where course is being taught: Anatone, Washington.
6. Availability of consultants for teachers: Available for scheduled visits and on call.
7. Activities conducted for in-service teacher training: The teachers are on the development team.
8. Implementation procedures in addition to above: (Not answered).
9. Implementation procedure, seemingly, the most effective: Unknown.

S. PROJECT EVALUATION:
1. Evaluation conducted by: Dr. Ray Jongeward, Northwest Regional Educational Laboratory.
2. Instruments used: (a) teacher daily log; (b) composite evaluation sheet; (c) student description form rating scales; (d) student questionnaire (pre and post); (e) student daily log; (f) student evaluation of instructional media; (g) differential apptitude test; .(h) STEP TEST (reading and listening).
3. Control groups: None used.
4. Feedback process: See S2 above.
5. Research evidence of objectives achieved: (Not answered).

T. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: (Not previously reported).

U. PLANS FOR THE FUTURE: (1) All evaluative data will be published. (2) Self-instructional systems materials will be made available to schools for field testing. Individual schools may submit proposals to engage in field testing or the testing may be done as a contracted service.

A. PROJECT TITLE: HIGH SCHOOL GEOGRAPHY PROJECT (HSGP).

B. PROJECT DIRECTOR: Nicholas Helburn, Director, HSGP, Box 1095, Boulder, Colorado 80302. Tel. 303-447-8150.

C. PROJECT HEADQUARTERS:
1. Contact: Information Program Editor, HSGP.
2. Special facilities or activities available for visitor viewing: None, but visitors welcome to talk with staff and view materials.

D. PRINCIPAL PROFESSIONAL STAFF: Nicholas Helburn, Director; George Vuicich, Associate Director; Richard Keppel, Assistant Director for Administration.

E. PROJECT SUPPORT:
1. Organizational sponsorship: Association of American Geographers.
2. Funding agency: National Science Foundation.

F. PROJECT HISTORY:
1. Principal originators: Joint Committee of the National Council for Geographic Education and the Association of American Geographers.
2. Date and place of initiation: 1961; First headquarters: San Fernando Valley State College, California.
3. Reason for initiation: To evaluate the nature and objectives of geography taught in secondary schools; to develop materials stressing conceptual learning objectives and incorporating current geographic ideas.

G. PRESENT COMMERCIAL AFFILIATIONS: None. Negotiations in progress with commercial publisher.

H. PURPOSES AND OBJECTIVES: A course content improvement program in geography. The project's goal is the development of new geography teaching materials for use at the high school level. Current work is concentrated on development of materials following a course outline on a settlement theme. Emphasis is on conceptual learning through the inductive approach.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study; laboratory (or field) investigations; lectures; discussion groups; simulation and role-playing games; model building.

J. ORIENTATIONS OF STATED OBJECTIVES: Content mastery; process acquisition; attitudinal changes (new behaviors).

K. LOCATION OF LIST OF OBJECTIVES: Teacher's Guide of each unit.

L. SPECIFIC SUBJECTS, GRADE AND AGE LEVELS: Geography, ninth or tenth grades.

M. DESCRIPTION OF MATERIALS ALREADY PRODUCED:
1. The Growth of Cities (Unit II), 1967 revision.
2. The Geography of Culture Change (Unit III), 1967 revision. (Have earlier provisional versions of eight units.)

N. MATERIALS AVAILABLE FREE: Newsletter available from project

headquarters. Also some reprints and progress reports.

O. MATERIALS PURCHASABLE: HSGP Demonstration Kit, $1.00 per copy, from project headquarters. (Contains sample activities from selected units.)

P. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

Q. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: (Not answered).

R. PROJECT IMPLEMENTATION:

1. Number of teachers using materials: Trial teachers in 1967-1968 school year equal 27.
2. Number of students involved: 1,300 students.
3. Number of schools involved: 27.
4. Sources of totals in 1, 2, and 3 above: (Not answered).
5. Name and location of specific schools where course is being taught: A few selected schools: Sequoia High School, Redwood City, California; Easthampton High School, Easthampton, Massachusetts; Regina High School, Minneapolis, Minnesota; Bassett High School, Bassett, Virginia.
6. Availability of consultants for teachers: Project staff and evaluators serve informally as consultants if needed.
7. Activities conducted for in-service teacher training: In-service activities being developed now by Teacher Education Coordinator.

S. PROJECT EVALUATION:

1. Evaluation conducted by: Evaluation team of the project in consultation with Educational Testing Service.
2. Instruments used: Observation, post- and pre-tests of teachers and students.
3. Control groups: (Not answered).
4. Feedback process: Special evaluation forms developed for each activity in a unit to be used by teacher. Also evaluation of each unit as a whole by teacher.
5. Research evidence of objectives achieved: None very valid. Some increase in learning of concepts from pre-tests to post-tests.
6. Availability of evidence: Available. Write the project office or visit the project.

T. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: Revisions of several units; development of teacher education (to include a film); school trials during winter 1967-1968; continuation of work on maps and aerial photos volume, book of outlines.

U. PLANS FOR THE FUTURE: Further revisions of units and further testing in school trials; units will begin to be transmitted to commercial publisher; further development of teacher education program.

A. PROJECT TITLE: ILLINOIS INSTITUTE OF TECHNOLOGY, SECONDARY SCHOOL COMPUTER SCIENCE EDUCATION (SSCSE), OPERATION COMPU/TEL.

B. PROJECT DIRECTOR: Mr. Charles R. Bauer, Director, SSCSE, IIT Computation Center, 3200 South Wabash, Chicago, Illinois 60616. Tel. 312-225-9600, ext. 1233.

C. PROJECT HEADQUARTERS:
1. Contact: Dr. Peter G. Lykos, Director, Computation Center, SSCSE.
2. Special facilities or activities available for visitor viewing: Saturday visits welcome by appointment.

D. PRINCIPAL PROFESSIONAL STAFF: Peter G. Lykos, Director, Computation Center; Charles R. Bauer, Director, SSCSE; Anthony A. Peluso, Associate Director, SSCSE; Gregory Czarnik, COMPU/TEL Coordinator.

E. PROJECT SUPPORT:
1. Organizational sponsorship: IIT supplies computer support.
2. Funding agency: None -- fee structure -- available brochure describes courses and fees. Cost sheet for COMPU/TEL.

F. PROJECT HISTORY:
1. Principal originator: Dr. Peter G. Lykos.
2. Date and place of initiation: February, 1963; IIT.
3. Reason for initiation: Dissemination of computer science information to secondary schools, faculties, and students.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PURPOSES AND OBJECTIVES: Workshops for Teachers, Supervisors and Administrators: The IIT Computation Center presents educators and other professional persons with an unusual opportunity by offering short, intensive, non-credit courses in computer science for school administrators, supervisors, college teachers, secondary school teachers and elementary school teachers. Courses for Students: The Computation Center of Illinois Institute of Technology announces programs in Computer Science for 6th-12th grade students. Operation COMPU/TEL; Student Access to a Large Computer from Remote Terminals: Illinois Institute of Technology, in conjunction with Illinois Bell Telephone Company, has brought the computer directly into the high school classroom via a telephone connection with the IIT Computation Center. This exciting new program, which began in October 1966, involves schools from Chicago, the suburbs, Gary, and other communities in northwestern Indiana. Both public and parochial schools are represented.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Lectures, team teaching.

J. ORIENTATIONS OF STATED OBJECTIVES: Content mastery, process acquisition, attitudinal changes, basic computer knowledge.

K. LOCATION OF LIST OF OBJECTIVES: (Not answered).

L. SPECIFIC SUBJECTS, GRADE AND AGE LEVELS: Computer Programming languages IITRAN, FORTRAN, COBOL, PL/I, STOP (an assembly language). See brochure for detailed course descriptions. Grade level, 6th grade to Graduate School.

M. DESCRIPTION OF MATERIALS ALREADY PRODUCED:
1. Brochure.
2. COMPU/TEL Cost Sheet and Information.
3. Reprints of Articles.
4. Course Outlines.
5. IITRAN/360 Self-Instructional Manual and Text, 1967 Addison-Wesley. Basic FORTRAN IV Programming Self-Instructional Manual and Text, 1968 Addison-Wesley. Basic PL/I Programming Self-Instructional Manual and Text (to be published in 1968 by Addison-Wesley).

N. MATERIALS AVAILABLE FREE: Items 1, 2, 3, 4 available upon request of Project Director.

O. MATERIALS PURCHASABLE: Item 5, Addison-Wesley Publishing Co., Reading, Mass.

P. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

Q. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: None at present.

R. PROJECT IMPLEMENTATION:
1. Number of teachers using materials: 30 in COMPU/TEL schools; many on IIT campus.
2. Number of students involved: Approximately 2,000 per year.
3. Number of schools involved: 26 in COMPU/TEL schools.
4. Sources of totals in 1, 2, and 3 above: From contracts and course enrollments.
5. Name and location of specific schools where course is being taught: The following is a partial list: Wirt High School, Gary, Indiana; Oak Park High School, Oak Park, Illinois; Lane Tech High School, Chicago, Illinois; Highland High School, Highland, Indiana; Lowell High School, Lowell, Indiana; Munster High School, Munster, Indiana; Chicago City College Wright Branch, Chicago, Illinois; Larkin High School, Elgin, Illinois; North Junior High School, DeKalb, Illinois; Leyden West High School, Northlake, Illinois; Lake Central High School, St. John, Indiana.
6. Availability of consultants for teachers: Available on consultant fee basis.
7. Activities conducted for in-service teacher training: All teacher-workshops are considered in-service training.
8. Implementation procedures in addition to above: None.
9. Implementation procedure, seemingly, the most effective: Use of consultants.
10. How evaluated: By growth in numbers of enrollees, and number of COMPU/TEL schools.

S. PROJECT EVALUATION:

1. Evaluation conducted by: Project headquarters' own instructors.
2. Instruments used: Questionnaires.
3. Control groups: None used.
4. Feedback process: Staff conferences.
5. Research evidence of objectives achieved: Successful computer programs written by participants; science fair participation.
6. Availability of evidence: Not available in formal form.

T. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: Increase in course offerings and COMPU/TEL schools.

U. PLANS FOR THE FUTURE: (Not answered).

A. PROJECT TITLE: INTERMEDIATE SCIENCE CURRICULUM STUDY (ISCS).

B. PROJECT DIRECTOR: Ernest Burkman, Professor of Science Education and Director, Intermediate Science Curriculum Study, Kellum Hall Basement, Florida State University, Tallahassee, Florida 32306. Tel. 599-3164.

C. PROJECT HEADQUARTERS:
1. Contact: Director, ISCS.
2. Special facilities or activities available for visitor viewing: None.

D. PRINCIPAL PROFESSIONAL STAFF: David Redfield, Stewart Darrow, John Bonar, William Snyder, Audley McDonald, Sally Kaicher, James A. Hathway.

E. PROJECT SUPPORT:
1. Organization sponsorship: None.
2. Funding agency: United States Office of Education.

F. PROJECT HISTORY:
1. Principal originator: Ernest Burkman.
2. Date and place of initiation: June 1966 (Pilot Study began June 1964); Florida State University.
3. Reason for initiation: (Not answered).

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PURPOSES AND OBJECTIVES:
1. To develop a comprehensive science program for grades 7-9.
2. Student materials are being written in "self-pacing" style. The students work through them at their own rate.
3. "Package" will contain materials designed for all student levels. "Excursions" (supplemental materials) are vehicle for accomodating both better than average and below average students.
4. The project is using computer assisted instruction as a vehicle for evaluation.
5. Sequence features gradual building of process skills and sequential development of basic notions. Transition is from tight structure in grade 7 to open ended activities in grade 9.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study; laboratory investigations; discussion groups; computer assisted instruction.

J. ORIENTATIONS OF STATED OBJECTIVES: Content mastery; process acquisition; scientific literacy.

K. LOCATION OF LIST OF OBJECTIVES: (Not answered).

L. SPECIFIC SUBJECTS, GRADE AND AGE LEVELS: Science for grades 7, 8, and 9.

M. DESCRIPTION OF MATERIALS ALREADY PRODUCED:
1. 7th grade core sequence, Volumes 1, 2.
2. 7th grade excursion sequence, Volumes 1, 2.
3. 8th grade core sequence, Volumes 3, 4, 5.
4. Supplemental problems booklet, Volumes 1, 2, 3, 4.

5. Teachers manuals for Volumes 1-5.
6. Equipment kit for volumes 1-5.
7. Achievement tests for volumes 1-5.
8. Computer assisted instruction program for volumes 1, 2.

N. MATERIALS AVAILABLE FREE: Newsletter.

O. MATERIALS PURCHASABLE: Contact Project Headquarters.

P. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

Q. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: None as yet.

R. PROJECT IMPLEMENTATION:
1. Number of teachers using materials: 117.
2. Number of students involved: Approximately 10,000.
3. Number of schools involved: 35.
4. Sources of totals in 1, 2, and 3 above: From control list maintained by the Project.
5. Name and location of specific schools where course is being taught: Test centers in Sarasota, Fla.; Glen Ellyn, Illinois; Keene, New Hampshire; Iowa City, Iowa; Indianapolis, Indiana; Tallahassee, Fla.; Beaverton-Portland, Oregon; Fullerton, Calif.; Baltimore County, Maryland; Nyack, New York.
6. Availability of consultants for teachers: Center leaders.
7. Activities conducted for in-service teacher training: Pre-school conference for all new try-out teachers and periodic meetings with center leaders.

S. PROJECT EVALUATION:
1. Evaluation conducted by: Project staff members.
2. Instruments used: Feedback from teachers, pre-tests and post-tests.
3. Control groups: Yes; (no description of how chosen).
4. Feedback process: Written comments by teachers; observation by center leaders and project staff; computer assisted instruction course being tested simultaneously; student responses to each step collected and analyzed.
5. Research evidence of objectives achieved: (Not answered).

T. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: Course now covers both 7th and 8th grades. Project continues to expand greatly.

U. PLANS FOR THE FUTURE: Summer 1968 - Revise 7th and 8th grade core, develop 9th grade core; summer 1969 - Revise 7th, 8th, and 9th grade core; develop AV aids, finalize revisions; tentative phase-out date, August 1971.

A. PROJECT TITLE: INTRODUCTORY PHYSICAL SCIENCE (IPS).

B. PROJECT DIRECTOR: Uri Haber-Schaim, Education Development Center, 55 Chapel Street, Newton, Massachusetts 02160. Tel. 617-969-7100.

C. PROJECT HEADQUARTERS:
1. Contact: Introductory Physical Science Program.
2. Special facilities or activities available for visitor viewing: None.

D. PRINCIPAL PROFESSIONAL STAFF: A number of people have worked on the project at various times. The preface to the textbook includes acknowledgements.

E. PROJECT SUPPORT:
1. Organizational sponsorship: Education Development Center.
2. Funding agency: National Science Foundation.

F. PROJECT HISTORY:
1. Principal originators: The preface to the textbook gives acknowledgements.
2. Date and place of initiation: 1963; Educational Services Incorporated, Watertown, Massachusetts.
3. Reason for initiation: To develop basic attitudes and skills with regard to science and to offer students insight into the means by which scientific knowledge is acquired, as well as offering students a beginning knowledge of physical science.

G. PRESENT COMMERCIAL AFFILIATIONS: Prentice-Hall, Inc., Englewood Cliffs, New Jersey 07632; Macalaster Scientific Corporation, 186 Third Avenue, Waltham, Massachusetts 02154; Modern Learning Aids, 1212 Avenue of the Americas, New York, New York 10036.

H. PURPOSES AND OBJECTIVES: To develop a one-year course in physical science for use in junior high schools. The student laboratory work is of primary importance. To emphasize this the laboratory instructions are incorporated in the body of the text; the results are not described. The equipment has been designed in such a way that the students can perform the experiments in ordinary classrooms.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Laboratory investigations, lectures, discussion groups, pre- and post-lab discussions.

J. ORIENTATIONS OF STATED OBJECTIVES: Content mastery, process acquisition, attitudinal changes, scientific literacy.

K. LOCATION OF LIST OF OBJECTIVES: Preface to the textbook.

L. SPECIFIC SUBJECTS, GRADE AND AGE LEVELS: The major emphasis in the course is the study of matter. The course has been extensively used in grades 8 and 9 with students who have a wide range of abilities. In addition, many schools have used

the course in grades 11 and 12 for students who do not plan to take further physics or chemistry.

M. DESCRIPTION OF MATERIALS ALREADY PRODUCED:
1. Textbook.
2. Teacher's Guide.
3. Laboratory equipment and apparatus.
4. Achievement tests.
5. Films.
6. Descriptive brochure.

N. MATERIALS AVAILABLE FREE: Item 6 from Introductory Physical Science Program, 55 Chapel Street, Newton, Massachusetts 02160.

O. MATERIALS PURCHASABLE: Item 1, $2.7. (hardcover) or $1.98 (paperback) from Prentice-Hall, Inc., Englewood Cliffs, New Jersey 07632. Item 2, $4.71 from Prentice-Hall, Inc., Englewood Cliffs, New Jersey 07632. Item 3, prices vary, catalogues can be obtained from either Prentice-Hall, Inc., Englewood Cliffs, New Jersey 07632 or Macalaster Scientific Corp., 186 Third Avenue, Waltham, Mass. 02154. Item 4, $9.45/package, from Prentice-Hall, Inc., Englewood Cliffs, New Jersey 07632. Item 5, prices vary, from Modern Learning Aids, 1212 Avenue of the Americas, New York, N.Y. 10036.

P. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

Q. LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: French, Japanese, Portuguese, Spanish.

R. PROJECT IMPLEMENTATION:
1. Number of teachers using materials: 3,500.
2. Number of students involved: 350,000.
3. Number of schools involved: Uncertain.
4. Sources of totals in 1, 2, and 3 above: From book sales figures, corrected for replacement of old books.
5. Name and location of specific schools where course is being taught: Unknown.
6. Availability of consultants for teachers: Not available, however, the IPS Group is instrumental in setting up workshops and providing workshop instructors.
7. Activities conducted for in-service teacher training: See 6.
8. Implementation procedures in addition to above: None.

S. PROJECT EVALUATION: Refer to the descriptive brochure for description of evaluation.

T. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: The commercial edition of the text and teacher's guide is now available. Another battery of tests is being prepared, particularly for less mathematically inclined students. Additional laboratory tests are in process.

U. PLANS FOR THE FUTURE: The project will phase out after the work

mentioned in Section T is completed.

A. PROJECT TITLE: IOWA SCIENCE AND CULTURE PROJECT (ISCP).

B. PROJECT DIRECTOR: Robert E. Yager and George W. Cossman, Science Education, University of Iowa, Iowa City, Iowa 52240. Tel. 319-353-3600.

C. PROJECT HEADQUARTERS:
1. Contact: Project directors, ISCP.
2. Special facilities or activities available for visitor viewing: Sample materials; demonstration class.

D. PRINCIPAL PROFESSIONAL STAFF: Robert Yager and George Cossman, Directors; Robert M. Fitch, John H. Haefner, Harold B. Engen, Paul W. Tweeten, Principal Staff; special consultants and an advisory panel are also involved with the preparation and evaluation of materials.

E. PROJECT SUPPORT:
1. Organizational sponsorships: University of Iowa; Iowa State Department of Public Instruction.
2. Funding agencies: University of Iowa Research Committee, U.S. Office of Education, National Science Foundation.

F. PROJECT HISTORY:
1. Principal originators: Robert E. Yager, Science Education, University of Iowa; J. Doyle Casteel, Social Studies Education, University of South Florida.
2. Date and place of initiation: Spring 1965; University of Iowa.
3. Reason for initiation: Future of most courses in science and social studies to teach the students the effect of science upon society and the effects of society upon science.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PURPOSES AND OBJECTIVES: The basic purpose of the project is to develop and evaluate a unique kind of secondary school course. It is hoped that this course will overcome past failures to achieve certain special objectives pursued somewhat more incidentally in separate subject matter areas. Essentially, these objectives involve bringing students to 1) understand the nature of the scientific process, the similarities and differences between science and other areas such as technology, the humanities, the social sciences, religion, and philosophy, the nature of science as a profession, the reciprocal relations between science and other facets of a culture and 2) a greater familiarity with, and adoption of, the values which underlie science. The project staff is working toward a course which represents general education in the full sense, uses the historical technique to best advantage, capitalizes on students' willingness to operate philosophically, and reunites the worlds of science and nonscience.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study, seminars, discussion groups.

J. ORIENTATIONS OF STATED OBJECTIVES: Process acquisition, attitudinal changes, scientific literacy.

K. LOCATION OF LIST OF OBJECTIVES: Supporting articles; descriptive brochure.

L. SPECIFIC SUBJECTS, GRADE AND AGE LEVELS: History and philosophy of science; 11th and 12th grades; science and other elements of society.

M. DESCRIPTION OF MATERIALS ALREADY PRODUCED:
1. Descriptive Articles.
2. Brochure.
3. Research Reports.
4. Ph.D. Dissertation.
5. Teaching Materials.
6. Special Materials for In-Service Work with Teachers.

N. MATERIALS AVAILABLE FREE: Items 1, 2, and 3 available from Project Headquarters.

O. MATERIALS PURCHASABLE: None as yet.

P. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

Q. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: (Not answered).

R. PROJECT IMPLEMENTATION:
1. Number of teachers using materials: 6.
2. Number of students involved: 100.
3. Number of schools involved: 2.
4. Sources of totals in 1, 2, and 3 above: Initial involvement of teachers and schools in the preparation of materials and their evaluation.
5. Name and location of specific schools where course is being taught: University High School, Iowa City; Kennedy High School, Cedar Rapids.
6. Availability of consultants for teachers: Weekly in-service meetings and classroom visits limited only to schools presently involved.
7. Activities conducted for in-service teacher training: NSF In-Service Institute; special in-service meetings conducted by Iowa State Department of Public Instruction.
8. Implementation procedures in addition to above: Science Education Consultant, Iowa State Department of Public Instruction.
9. Implementation procedure, seemingly, the most effective: Institutes for prospective teachers.
10. How evaluated: Observation of classrooms of teachers as involved.

S. PROJECT EVALUATION:
1. Evaluation conducted by: (Not answered).
2. Instruments used: Test on Understanding Science - "Science Opinion Survey"; Test on Understanding Science - "Facts About Science"; Watson-Glaser Critical Thinking Appraisal; Stanford

Advanced Science Achievement Test; Study of Values; Iowa Science and Culture Study Achievement Test.
3. Control groups: Control groups were selected by securing "matched" students who were given the same pre and post tests as the "Science and Culture" students.
4. Feedback process: Weekly comments from teachers; testing program.
5. Research evidence of objectives achieved: The significant differences with all test instruments are reported in George W. Cossman's Ph.D. dissertation "The Effects of a Course in Science and Culture Designed for Secondary School Students".
6. Availability of evidence: Dissertation microfilm service.

T. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: The Science & Culture course is undergoing extensive revision as to unit organization and structure. The revised materials will not be completed until fall 1968. As a result of the revision, all former teaching materials are no longer available for examination.

U. PLANS FOR THE FUTURE: Expanded testing program in additional schools 1968-69; a writing conference with expanded staff - 1969; expanded testing and institute program 1969-70.

A. PROJECT TITLE: THE MADISON PROJECT OF SYRACUSE UNIVERSITY AND WEBSTER COLLEGE.

B. PROJECT DIRECTOR: Professor Robert B. Davis, Mathematics Department, Smith Hall, Syracuse University, Syracuse, N.Y. 13210. Tel. 315-476-3768 or 315-GR6-5541, ext. 2336.

C. PROJECT HEADQUARTERS:

1. Contact: Inquiry Department, The Madison Project.
2. Special facilities or activities available for visitor viewing: By special arrangement it is possible to visit classrooms in various schools, including culturally deprived situations, non-graded schools using various forms of flexible programming and team teaching, etc. In addition, it is possible to view project films (which also show actual classroom lessons), and to talk with project personnel about special problems of various sorts. Some project classrooms center around "mathematics laboratories."

D. PRINCIPAL PROFESSIONAL STAFF: Senior research associates and senior demonstration teachers: Beryl S. Cochran, Frank Van Atta, Donald Cohen, Katharine Kharas, Katherine Vaughn, Katie Reynolds, Ogie Wilkerson, Gordon Clem, Doris Machtinger, Irene Travis, Gerald Glynn, Elizabeth Herbert, Anita Tannuzzo, John Gessel, Donna Doyle, William Fitzgerald, Irvin Vance, Russell Magnuson, Irwin Gordy, Earl Beam, Jacqueline Robertson, Lauren Woodby, Alice Hart; administrative assistants: Martha Bowen, Marcia Paige; in charge of manuscript production: Bernice Talamante; in charge of films and videotapes: Jane Lesinski; coordinators for Syracuse University: Donald E. Kibbey, Chairman, Mathematics Department; Dean David Krathwohl, College of Education; coordinator for Webster College: Jacqueline Grennan, President, Webster College. Coordinator for San Diego County: Jack Price; coordinator for New York Public Schools: George Grossman; coordinator for Philadelphia Public Schools: Karl Kalman; coordinator for Los Angeles City Schools: George Arbogast.

E. PROJECT SUPPORT:

1. Organizational sponsorships: Syracuse University, Webster College, and a group of participating school systems.
2. Funding agencies: National Science Foundation; Marcel Holzer Foundation; The Alfred P. Sloan Foundation; and a group of industries and trade unions in the St. Louis area, as well as by contributions from participating schools and colleges.

F. PROJECT HISTORY:

1. Principal originators: Robert B. David, Donald E. Kibbey, Beryl S. Cochran and the faculties of Syracuse University and Webster College.
2. Date and place of initiation: 1957; Syracuse, New York, and Weston, Connecticut.
3. Reason for initiation: The Madison Project was created in part in order to revitalize the teacher education program in

mathematics at Syracuse University, particularly with reference to achieving a closer relation between the studies of prospective teachers and the operational problems of high quality schools. (This included schools in culturally deprived areas where the school program itself was in some measure exemplary.) There was also a second reason for the creation of the project, namely the conviction that even the best schools were doing a great deal less than the best possible job of introducing children to mathematics, to science, and to other areas of our culture (as well as doing less than an optimal job in promoting the student's self-understanding and growth toward maturity).

G. PRESENT COMMERCIAL AFFILIATIONS: Four volumes of materials are available from Addison-Wesley Publishers, namely: Discovery in Mathematics, Student Discussion Guide; Discovery in Mathematics, A Text for Teachers; Explorations in Mathematics, Student Discussion Guide; Explorations in Mathematics, A Text for Teachers.

H. PURPOSES AND OBJECTIVES: To develop, disseminate and implement a supplementary program in mathematics for nursery school through grade 12. Special attention is given to the kind of creative learning experience which children can have in school and outside of school. This involves extensive consideration of the social organization of the classroom and of similar matters. In general, the "point of intervention" for the Madison Project is either at the point of actual classroom experience of the child, or else at the point of instructional planning on the part of the teachers. It is not at the point of designing textbooks or producing textbooks. Because of the emphasis on actual classroom experiences, the project makes a very large number of video-tapes and films that show actual classroom lessons. At the present time, these films, or excerpts from them, are available in many different forms for study by teachers or by prospective teachers. In addition, the project for the last two years has put special emphasis upon "mathematics laboratories" and the use of physical materials; in doing this, it has often joined forces with the Elementary School Science (ESS) Project of ESI, and with the Nuffield Mathematics Project in England. The project has put particular emphasis upon operating workshops for teacher education, particularly in the cities of San Diego, Los Angeles, Chicago, New York, Philadelphia, St. Louis, and Washington, D.C.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study; programmed instruction; laboratory investigations; lectures; seminars; discussion groups; small-group "committee" work.

J. ORIENTATIONS OF STATED OBJECTIVES: Content mastery; process acquisition; attitudinal changes; maturity; self-understanding.

K. LOCATION OF LIST OF OBJECTIVES: Robert B. Davis, Explorations in Mathematics. A Text for Teachers. Addison-Wesley (1967), pp. 5-6.

L. SPECIFIC SUBJECTS, GRADE AND AGE LEVELS: The Madison Project is, of course, concerned both with materials and with methods; its work might, consequently, be described as dealing both with curriculum and with instruction. The present summary of mathematical content should not, therefore, obscure the fact that the project's activities have dealt with equal emphasis in both the curriculum area and the instruction area. The project's mathematical content divides into two portions: the first part deals with mathematical content which is relatively novel at the grade levels in question. This includes mainly coordinate geometry, an axiomatic approach to algebra, some mathematical logic, the theory of limits, and applications to physical science. A second (and more recent) part of the project materials deals with topics which are relatively familiar at the grade levels in question, which the project is concerned mainly with improving the child's opportunities to learn the basic ideas. This latter portion deals, necessarily, mainly with fundamental ideas of arithmetic (such as: place value numerals, the concept of division, etc.) Grade levels range from nursery school through college.

M. DESCRIPTION OF MATERIALS ALREADY PRODUCED:

1. Discovery in Mathematics. (Publishers, Addison-Wesley Publishing Co., Inc.) Student discussion guide, plus text for teachers. This book provides a supplementary program in coordinate geometry, axiomatic algebra, and applications to science, suitable especially for grades 4-8. It is concerned particularly with creative learning experiences of a non-routine nature.
2. Explorations in Mathematics. Student discussion guide, plus text for teachers. This book is concerned with introductory ideas in algebra, statistics, mathematical logic, matrix algebra, and some applications to physics. Special emphasis is placed upon historical background, and the study of this book can be closely related to various units in social studies (such as the life and times of Rene Descartes). It is suitable for grades 6 through 9, inclusive.
3. A Modern Mathematics Program as it Pertains to the Interrelationship of Mathematical Content, Teaching Methods, and Classroom Atmosphere. (The Madison Project). 1963. Report submitted to the Commissioner of Education, U.S. Office of Education, fall, 1963. This provides a general view of Madison Project activities.
4. A Modern Mathematics Program as it Pertains to the Interrelationship of Mathematical Content, Teaching Methods, and Classroom Atmosphere. (The Madison Project). 1965. Report submitted to the Commissioner of Education, U.S. Office of Education, fall 1965. Note that this is distinguishable from item 3 above only by the date. The 1965 report is the most comprehensive description presently available of Madison Project materials and activities.
5. The Madison Project - A Brief Introduction to Materials and

Activities (1965).
6. Notes on the Film: First Lesson. (This pamphlet accompanies the film of the same name.)
7. Robert B. Davis, Some Remarks on "Learning By Discovery".
8. Robert B. Davis, The Next Few Years.
9. Robert B. Davis, Experimental Course Report/Grade Nine.
10. Doris Machtinger, Experimental Course Report/Kindergarten.
11. Supplementary Modern Mathematics for Grades 1 through 9. In-Service Course #1 for Teachers. This is a complete "packaged" in-service course, including films, written materials, and laboratory equipment.
12. Supplementary Modern Mathematics for Grades 2 through 9. In-Service #2 for Teachers. This is a sequel to item 11 above.
13. Audio tape recording #D-1: □ + □ = 2 x □ . This is a recording of an actual classroom lesson with fifth grade children, proving algebraic theorems from a set of axioms selected by themselves.
14. Film (16 mm., sound, black and white) A Lesson with Second Graders. This film shows an actual classroom lesson involving signed numbers, the number line, and Cartesian co-ordinates. Viewing this film is one of the best introductions to project activities.
15. Film (16 mm., sound, black and white) Complex Numbers via Matrices. This film shows an actual classroom lesson. Seventh grade students use the isomorphism between rational numbers and a sub-set of the set 2-by-2 matrices to facilitate an extension into complex numbers.
16. Film (16 mm., sound, black and white) Matrices. An actual classroom lesson. Fifth and sixth graders explore the algebra of 2-by-2 matrices.
17. Film (16 mm., sound, black and white) Solving Equations With Matrices. An actual classroom lesson, similar to item 15 above, but less sophisticated. Sixth grade students.
18. Film (16 mm., sound, black and white) Average and Variance. An actual classroom less, with 6th grade children.
19. Film (16 mm., sound, black and white) Graphing an Ellipse. An actual classroom lesson, with 7th grade students.
20. Film (16 mm., sound, black and white) Circles and Parabolas. An actual classroom lesson, with 6th grade children.
21. Film (16 mm., sound, black and white) First Lesson. An actual classroom lesson, with a mixed class of children from grades 3 to 7.
22. Film (16 mm., sound, black and white) Second Lesson. This lesson occurred on the day following that shown in item 21 above, with the same students.
23. Film (16 mm., sound, black and white) Weights and Springs. A "laboratory" lesson, with 6th grade children.
24. Film (16 mm., sound, black and white) Graphing a Parabola. This is a portion of the film listed as item 20.
25. Film (16 mm., sound, black and white) Guessing Functions. A seventh grade class of culturally deprived urban children.
26. "Shoebox" packages for physical experiments related to the

mathematics program, or for physical and tactile experiences related to the learning of mathematics. (The project also makes use of physical materials prepared by Z.P. Dienes, by ESS, by Nuffield Project, and by others, as well as desk calculators of various sorts.)

N. MATERIALS AVAILABLE FREE: This varies according to availability of reprints of various articles. The Madison Project, Smith Hall, Syracuse University, Syracuse, N.Y. 13210.

O. MATERIALS PURCHASABLE: From Addison-Wesley Publishing Co., Inc., Reading, Massachusetts: Item 1, Discovery in Mathematics - Student Discussion Guide, $2.48; A Text for Teachers, $8.00. Item 2, Explorations in Mathematics - Student Discussion Guide, $2.68; A Text for Teachers, $8.00. From The Madison Project, 8356 Big Bend Boulevard, St. Louis, Missouri 63119: Item 9, Experimental Course Report/Grade Nine, $1.50. Item 10, Experimental Course Report/Kindergarten, $1.50.

P. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

Q. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: None planned at present.

R. PROJECT IMPLEMENTATION:

1. Number of teachers using materials: Very large, but unknown.
2. Number of students involved: Very large, but unknown.
3. Number of schools involved: Unknown.
4. Sources of totals in 1, 2, and 3 above: Based upon work with the four cities of Los Angeles, Chicago, New York, and Philadelphia, part of Washington, D.C. and St. Louis, Missouri, and with San Diego County schools, as well as a smaller number of schools in other areas. The percentage of schools in these various cities that have been effectively reached thus far is not known, and is not easily determined.
5. Name and location of specific schools where course is being taught: Weston, Connecticut Elementary School; St. Thomas Choir School, New York City; Attucks Branch, St. Louis Public Schools; Columbia School, St. Louis Public Schools; Bruce Elementary School, Model School District, Washington, D.C.; Montgomery Elementary School, Model School District, Washington, D.C.; Bancroft School, Model School District, Washington, D.C.; plus some schools in England.
6. Availability of consultants for teachers: Available. See R7 below.
7. Activities conducted for in-service teacher training: A special workshop program operates in San Diego County, in Los Angeles, in Chicago, in New York City, in Philadelphia, and in Washington, D.C. Various special workshops--usually of about one week duration--operate in various parts of the United States at different times, for example, in the Kansas City, Missouri area, in Miami, Florida, in Corpus Christi, Texas, and in the states of Idaho, Colorado, and Montana. A Master of Arts in Teaching Program which emphasizes Madison Project materials is

in operation at Webster College. (For information, write to Professor Katharine Kharas, Webster College.)
8. Implementation procedures in addition to above: The project hopes to complete a report on techniques for the diffusion of innovation in various school settings.

S. PROJECT EVALUATION: Please refer to project literature for description of evaluation.

T. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: The project has continued to operate in much the same manner as reported in 1967.

U. PLANS FOR THE FUTURE: The project hopes to be cooperating with other organizations in a concerted attack to combine workshops for school teachers with two other aspects of what amounts to the same problem: improving college methods and content courses for elementary school teachers, and the creation of appropriate curriculum materials and school experiences.

A. PROJECT TITLE: MATHEMATICS COMPUTER CENTER.

B. PROJECT DIRECTOR: Dr. Virginia T. Gilbert, 321 So. 9th St., Apt. 15, Las Vegas, Nevada 89101. Tel. 702-385-3300.

C. PROJECT HEADQUARTERS:
1. Contact: Virginia T. Gilbert, Mathematics Computer Center, Valley High School, 2839 So. Burnham, Las Vegas, Nevada 89109. Tel. 702-735-0166.
2. Special facilities or activities available for visitor viewing: The Computer Center, housing the NCR-310 computer, flexiwriters, and data-transmission equipment is open daily, Monday through Friday, from 8 A.M.-4:00 P.M. It is open evenings and Saturdays by appointment.

D. PRINCIPAL PROFESSIONAL STAFF: Co-Managers of the Center are Ronald L. Gutzman and Robert O. Pinneo.

E. PROJECT SUPPORT: The project is funded by Title III, Elementary and Secondary Education Act of 1965.

F. PROJECT HISTORY:
1. Principal originators: Dr. Virginia T. Gilbert and Mr. Herbert Steffens.
2. Date and place of initiation: November 1965; Las Vegas, Nevada.
3. Reason for initiation: Complete absence of any computer time available by secondary school students in the state of Nevada.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PURPOSES AND OBJECTIVES: To expand and enrich the entire mathematics curriculum including: increasing interest and holding power in math; deepening student's mathematical understanding; and extending the mathematical content as well as including practical application from science, engineering, business, and the community. To help students to develop organized thought processes and to show them the necessity of a precise mathematical formulation in problem solving through: utilizing the computer as a tool and learning computer techniques. To improve attitudes and values concerning the place of computers in our modern technological society.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study; laboratory investigations; lectures; seminars; discussion groups.

J. ORIENTATIONS OF STATED OBJECTIVES: Process acquisition; attitudinal changes.

K. LOCATION OF LIST OF OBJECTIVES: In the original proposal to the U.S.O.E., and in the first preliminary evaluation report submitted to the U.S.O.E.

L. SPECIFIC SUBJECTS, GRADE AND AGE LEVELS: A beginning course in computer science is offered in several of the high schools in

Clark Co. The use of the computer as a tool in mathematics is stressed in several of the schools in junior and senior mathematics courses.

M. DESCRIPTION OF MATERIALS ALREADY PRODUCED:
1. Complete introductory course in computer science for high school students in "Unipac" form. (This is the learning packet favored by the Dissemination Center.)
2. A series of teaching packets to help the classroom teacher integrate computer science into the regular mathematics curriculum.

N. MATERIALS AVAILABLE FREE: Items 1 and 2 (while supplies last).

O. MATERIALS PURCHASABLE: None.

P. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English - the programming language is a modified form of Fortran II.

Q. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: None.

R. PROJECT IMPLEMENTATION:
1. Number of teachers using materials: Materials are in the hands of approximately 80 teachers, perhaps 40 are really using them.
2. Number of students involved: 400.
3. Number of schools involved: 40.
4. Sources of totals in 1, 2, and 3 above: Estimation.
5. Name and location of specific schools where course is being taught: Valley High School, Las Vegas, Nev.; Western High School, Las Vegas, Nev.; Basic High School, Henderson, Nev.
6. Availability of consultants for teachers: Available; the Co-managers of the Computer Center, along with the Assistant Computer Center Manager, are available for help. The teachers may make appointments to see them.
7. Activities conducted for in-service teacher training: Four sections of a 3 semester hour in-service course in Computer Methods in Secondary Mathematics have been offered. (One is just being comp[illegible]d, Feb. 8). A total of 94 teachers will then have been trained.

S. PROJECT EVALUATION:
1. Evaluation conducted by: Dr. Verdun Trione, Associate Professor of Education at Nevada Southern University.
2. Instruments used: Standardized mathematics tests, attitude surveys, and interviews.
3. Control groups: Yes, chosen randomly.
4. Feedback process: (Not answered).
5. Research evidence of objectives achieved: No statistical evidence.
6. Availability of evidence: The findings will be published and will also be available to interested parties, upon contacting the Project Director.

T. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: (Not

previously reported).

U. PLANS FOR THE FUTURE: Curriculum revision and addition - June 1968; publication of findings following September 1968; operation to be taken over and supported by the Clark Co. School District after June 30, 1968.

A. PROJECT TITLE: MICHIGAN SCIENCE CURRICULUM COMMITTEE JUNIOR HIGH SCHOOL PROJECT (MSCC-JHSP).

B. PROJECT DIRECTOR: Dr. W.C. Van Deventer, Dept. of Biology, Western Michigan University, Kalamazoo, Michigan 49001. Tel. 616-383-1671.

C. PROJECT HEADQUARTERS:
1. Contact: Dr. W.C. Van Deventer, Project Director, or Mr. Jack Kammeraad, Associate Director, MSCC-JHSP, State of Michigan Department of Education, Lansing, Michigan 48902.
2. Special facilities or activities available for visitor viewing: None regularly; some experimental classes.

D. PRINCIPAL PROFESSIONAL STAFF: Editor of Project Materials: Lucile Duyser, Science Coordinator for Inter City Schools, Grand Rapids, Michigan; Consultants: Robert Sternberg, Secondary Education Specialist, State of Michigan Department of Education; Peter Wallus, Secondary Curriculum Coordinator, Kalamazoo, Michigan Public Schools.

E. PROJECT SUPPORT:
1. Organizational sponsorship: Michigan Science Curriculum Committee, operating under the Michigan State Department of Education.
2. Funding agency: State of Michigan Department of Education and Department of Biology, Western Michigan University.

F. PROJECT HISTORY:
1. Principal originator: Michigan Science Curriculum Committee.
2. Date and place of initiation: October 1963; Battle Creek, Michigan.
3. Reason for initiation: As a follow-up on the publication of its K-12 Science Program by the Michigan State Department of Education, the Committee decided to undertake research in the development of curricular materials at the junior high school level, an area which they considered to be relatively neglected at that time.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PURPOSES AND OBJECTIVES: To develop and test open-ended laboratory experiences which are directed toward interdisciplinary ideas; to develop a means of evaluating the extent of students' understanding of these ideas as a result of open-ended laboratory experiences. The project is centered on inquiry. The process of inquiry is taken to mean the approach to an idea by students and teacher in terms of open-ended laboratory experiences through questions asked at various levels of difficulty. As a basis for evaluation, the investigators believe that the questions students ask furnish a better indication of the extent and quality of their thinking in relation to an idea than any answers they may give to questions asked of them.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study,

laboratory investigations, discussion groups, team study.

J. ORIENTATIONS OF STATED OBJECTIVES: Attitudinal changes, learning the method of inquiry, understanding interdisciplinary ideas.

K. LOCATION OF LIST OF OBJECTIVES: In the introductory section entitled A New Approach to Interdisciplinary Seventh Grade Science.

L. SPECIFIC SUBJECTS, GRADE AND AGE LEVELS: Seventh grade general science. Some of the materials have been used successfully, however, at sixth and eighth grades.

M. DESCRIPTION OF MATERIALS ALREADY PRODUCED:

1. Rationale of the project: A New Approach to Interdisciplinary Seventh Grade Science.
2. Criteria for Writing or Evaluating Laboratory Experiences.
3. Thirteen units consisting of a total of 55 laboratory experiences. Each unit is directed toward a specific idea. The ideas are groups under two of the basic assumptions of scientists in dealing with the natural world.
   a. Scientists in looking at the natural world assume the universality of change:
      1) Idea of dynamic equilibrium.
      2) Idea of change and variation.
      3) Idea of normal curves and warping factors.
      4) Idea of gradients.
      5) Idea of extrapolation and interpolation.
      6) Idea of cycles and cyclic change.
      7) Idea of directional change in response to the challenge of the environment.
   b. Scientists think of the natural world in terms of relationships rather than absolutes
      1) Idea of measurement as an expression of relationship.
      2) Idea of templates or transference of pattern.
      3) Idea of interdependence and interrelationship.
      4) Idea of the necessary interaction of heredity and environment.
      5) Idea of differential rates of processes in development.
      6) Idea of tools, machines, and outside sources of energy as extensions of man's body and its capabilities.
4. Suggested Procedure for Teachers Wishing to Use MSCC-JHSP Materials.
5. Sample Tests, based on student questions.

N. MATERIALS AVAILABLE FREE: All of the materials (1-5) listed under Section M may be obtained from Dr. W.C. Van Deventer, Director of MSCC-JHSP, at Project Headquarters.

O. MATERIALS PURCHASABLE: None.

P. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

Q. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: None.

R. PROJECT IMPLEMENTATION:

1. Number of teachers using materials: It is difficult to say how many teachers or school systems are using the MSCC-JHSP materials at present. They have been distributed, free, to approximately 1,500 teachers and science supervisors in 40 states and 16 foreign countries at their request. Informal feedback is received from many of the recipients of the materials. Use of the materials varies from teachers who are following the procedure suggested by the Project staff to those who are using them simply as a supplement to other junior high science textbooks or curricula.
2. Sources of totals in 1 above: A complete correspondence file has been kept based on the distribution of the materials.
3. Name and location of specific schools where course is being taught: Experimental work at present is being carried on in the Kalamazoo Public Schools, Michigan.
4. Availability of consultants for teachers: The Director and Associate Director, and other members of the Michigan Science Curriculum Committee work with teachers in the Michigan schools who are using the materials. Work with teachers outside Michigan has to be limited to correspondence, though this is extensive.
5. Activities conducted for in-service teacher training: See above.

S. PROJECT EVALUATION:

1. Evaluation conducted by: No outside agency is being used at present.
2. Instruments used: Tests are prepared from questions asked by students following completion of a series of laboratory experiences directed toward a specific idea. In taking the tests the students are asked to discriminate between questions which are related to the idea and those which are not so related.
3. Control groups: Under present conditions of support, it has not been possible to set up formal experimentation with control groups.
4. Feedback process: Teachers using the materials collect student questions and send these to the Director. He prepares tests from these questions. Each test is related to a specific idea. The teacher administers the tests and returns the results to the Director's office for evaluation.
5. Research evidence of objectives achieved: The behavioral objective sought is a demonstration of understanding of the ideas toward which the laboratory experiences are directed. It is believed that the questions students ask give a better indication of extent and quality of their thinking in relation to ideas than the answers they might give to questions asked of them. Some preliminary experimentation has indicated significant correlations of the results of tests of the type described above with standard seventh grade achievement tests. Systematic collection of research evidence must await development of additional tests, and more extensive financial support

than is now available.
6. Availability of evidence: Available through written request to the Project Director.

T. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: Additional laboratory experiences have been developed. The "idea of transference of pattern" has been added. All of the project materials have been extensively reorganized. A working unit on "The Point of View of a Scientist and the Kinds of Things He Does," has been developed and is undergoing experimentation.

U. PLANS FOR THE FUTURE: The materials are now being readied for possible commercial publication.

A. PROJECT TITLE: MINNESOTA MATHEMATICS AND SCIENCE TEACHING PROJECT (MINNEMAST).

B. PROJECT DIRECTOR: James H. Werntz, Jr., 720 Washington Avenue S.E., Minneapolis, Minnesota 55414. Tel. 612-373-3522.

C. PROJECT HEADQUARTERS:
1. Contact: Project Director.
2. Special facilities or activities available for visitor viewing: Library, equipment room, trial schools.

D. PRINCIPAL PROFESSIONAL STAFF: Roger Jones, Director of Science; Mason R. Boudrye, Administrator; Wells Hively, Research Director.

E. PROJECT SUPPORT:
1. Organizational sponsorship: University of Minnesota.
2. Funding agencies: National Science Foundation; U.S. Office of Education.

F. PROJECT HISTORY:
1. Principal originator: Paul C. Rosenbloom, formerly Professor of Mathematics and Director.
2. Date and place of initiation: 1961; University of Minnesota.
3. Reason for initiation: (Not answered).

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PURPOSES AND OBJECTIVES: To produce coordinated mathematics and science curriculum for grades K-6, and materials for in-service education of teachers.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Laboratory investigations; discussion groups; small group activities; individual worksheets and activities.

J. ORIENTATIONS OF STATED OBJECTIVES: Process acquisition; attitudinal changes; scientific literacy.

K. LOCATION OF LIST OF OBJECTIVES: "Overview"; teachers' manuals for various units.

L. SPECIFIC SUBJECTS, GRADE AND AGE LEVELS: Coordinated mathematics and science, elementary and college level.

M. DESCRIPTION OF MATERIALS ALREADY PRODUCED:
1. Minnemath Reports.
2. Mathematics: Units I - XXVI.
3. Science: Units K-1 through 3.3.
4. Coordinated Units: 1-14, kindergarten and first grade.
5. "Overview".
6. "Living Things in Field and Classroom".
7. "Questions and Answers about MINNEMAST".
8. "Ideas in Mathematics".

N. MATERIALS AVAILABLE FREE: Items 1, 5, and 7 from project headquarters.

O. MATERIALS PURCHASABLE: Items 2, 3, 4, and 6. Lists and costs available on request from project headquarters.

P. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

Q. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: None.

R. PROJECT IMPLEMENTATION:

1. Number of teachers using materials: 439.
2. Number of students involved: 15,000.
3. Number of schools involved: 76.
4. Sources of totals in 1, 2, and 3 above: Counted 1 and 3; estimated 2.
5. Name and location of specific schools where course is being taught: The following is a partial listing: Alverno Elementary School, Milwaukee, Wisconsin; Nevada Community Schools, Nevada, Iowa; Campus Laboratory School, Union, New Jersey; Conestoga School, Omaha, Nebraska; Howard Elementary School, San Antonio, Texas; Youngsville Elementary School, Youngsville, Louisiana; Breck Elementary School Minneapolis, Minnesota.
6. Availability of consultants for teachers: Available; college centers provide in-service assistance for teachers.
7. Activities conducted for in-service teacher training: Monthly visits to each school and each teacher's class. Two general evening meetings per year.
8. Implementation procedures in addition to above: A series of 3-day workshops for math-science methods teachers and curriculum supervisors and a 5-week summer workshop for 4 member school district teams.
9. Implementation procedure, seemingly, the most effective: Summer workshop.
10. How evaluated: After the first workshop, last summer, each of the 6 teams implemented the program in a local school district. Evaluation continuing.

S. PROJECT EVALUATION:

1. Evaluation conducted by: A separate research and evaluation committee consisting mainly of psychologists.
2. Instruments used: Standardized tests and universe defined tests for each unit. The intent of the latter is to gain an estimate of the proportion of the students who exhibit specified behaviors taken to represent the goals of each unit of instruction.
3. Control groups: Yes used; for the standardized testing project an attempt is made to match students on the basis of standard I.Q. scores. For the universe defined testing project the staff is attempting to match schools on a rough estimate of socio-economic level.
4. Feedback process: Feedback comes in three forms: (1) observers visit in the classrooms and provide written reports; (2) teachers complete an evaluation form on each lesson; (3) the results of the universe defined testing is reported as proportions.

5. Research evidence of objectives achieved: Several reports are in preparation.
6. Availability of evidence: Not available at present. Request copies (when available) from: Donald Sension, Coordinator for Research and Evaluation, MINNEMAST Project, 720 Washington Avenue S.E., Minneapolis, Minnesota 55414.
7. Other pertinent information: The model for the universe defined testing project requires that first a universe of criterion behaviors be defined for a given unit, and secondly that a procedure be established for giving information about the students' knowledge of that universe. The staff is doing both of these by using "item forms". These item forms partition the universe into subsets of behavior. Physically an item form consists of a script to be presented to the student. The script may contain one or more variables. Replacement sets are defined for the variables as well as a scheme for sampling from these sets. Often an item form also involves the use of various sets of physical objects. By following this procedure an extremely large set of test items is defined for each unit. To gain an estimate of the proportion of MINNEMAST students who can demonstrate a given behavior the staff is sampling both items within item forms and students within classes.

T. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: Continued production of coordinated units; implementation workshop, summer 1967.

U. PLANS FOR THE FUTURE: Production of curriculum materials, grades 3-6.

A. PROJECT TITLE: NSTA-NASA AEROSPACE SCIENCE EDUCATION PROJECT.

B. PROJECT DIRECTOR: Albert F. Eiss, Associate Executive Secretary, National Science Teachers Association, 1201 Sixteenth Street, N.W., Washington, D.C. 20036. Tel. 202-223-9400, ext. 521.

C. PROJECT HEADQUARTERS:
1. Contact: Project Director, NSTA-NASA Aerospace Science Education Project.
2. Special facilities or activities available for visitor viewing: Not applicable.

D. PRINCIPAL PROFESSIONAL STAFF: Mrs. Mary Blatt Harbeck (formerly, Coordinator of Science and Math, Department of Public Instruction, Harrisburg, Pa.); Mr. Richard Crone, Science Education Specialist, Educational and Special Programs Office, Goddard Space Flight Center, Greenbelt, Md.; Mr. Elva Bailey Acting Chief, Educational and Special Programs Office, Goddard Space Flight Center, Greenbelt, Md.; Mr. Jack Callow, Educational and Special Programs Office, Goddard Space Flight Center, Greenbelt, Md.

E. PROJECT SUPPORT:
1. Organizational sponsorship: National Science Teachers Association.
2. Funding agency: National Aeronautics and Space Administration.

F. PROJECT HISTORY:
1. Principal originator: National Science Teachers Association.
2. Date and place of initiation: August 1, 1964; Washington, D.C.
3. Reason for initiation: Space science was not being adequately treated by any of the curriculum projects being developed on a nation-wide basis. Emerging science courses lacked emphasis on engineering and engineering applications. The extreme interest shown by students in various aspects of space science was not being met with appropriate activities. Because the study of space science involves principles from every major scientific discipline, it can provide an excellent medium for teaching basic principles of science.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PURPOSES AND OBJECTIVES: To produce inquiry-centered materials in aerospace science for student use, to assist teachers in incorporating space science materials into their science programs, and to encourage greater emphasis on the processes of scientific inquiry in the classroom.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study; laboratory investigations; discussion groups.

J. ORIENTATIONS OF STATED OBJECTIVES: Process acquisition; attitudinal changes; scientific literacy; career guidance.

K. LOCATION OF LIST OF OBJECTIVES: (Not answered).

L. SPECIFIC SUBJECTS, GRADE AND AGE LEVELS: Junior high school.

M. DESCRIPTION OF MATERIALS ALREADY PRODUCED:
1. One volume titled, "A Universe to Explore" is ready for printing. It contains space oriented activities and investigations for junior high students.
2. Newsletter: Relay News, "Aerospace Bibliography".

N. MATERIALS AVAILABLE FREE: Item 2.

O. MATERIALS PURCHASABLE: Write to Director after May 1, 1968, for source and price of item 1.

P. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

Q. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: None.

R. PROJECT IMPLEMENTATION: No information available.

S. PROJECT EVALUATION: No information available.

T. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: (Not previously reported).

U. PLANS FOR THE FUTURE: Project completed, except for publishing.

A. PROJECT TITLE: NATURAL SCIENCE IN GENERAL EDUCATION.

B. PROJECT DIRECTOR: Edwin A. Arnfield, Associate Professor, Area Head, Division of Basic Education, Macomb County Community College, 14500 East Twelve Mile Road, Warren, Michigan 48093. Tel. 313-772-8000, ext. 276.

C. PROJECT HEADQUARTERS:
1. Contact: Natural Science in General Education, Department of Natural Science (B-308), Macomb County Community College.
2. Special facilities or activities available for visitor viewing: Lecture and laboratory facilities. Classroom visitations when semesters are in progress.

D. PRINCIPAL PROFESSIONAL STAFF: Edwin Arnfield, Area Head; Douglas P. Dassow; Dorothy Buchan, Mary McCartney, Karl Sjolander; Peter Tomlinson, First Semester Course Evaluator.

E. PROJECT SUPPORT: Funds are internal through the Board of Trustees, Community College, District of Macomb County.

F. PROJECT HISTORY:
1. Principal originators: Faculty and administrative committee which studied and initiated the Educational and Cultural Development Program. Chairman of the Committee, Mr. James Munro. Science program developed under direction of Gus John Demas, Area Head.
2. Date and place of initiation: July 1, 1965; Macomb County Community College, South Campus.
3. Reason for initiation: This program was initiated specifically for the "middle group" student (those who score between the 10th and 60th percentile on the SCAT Total Score). Previous studies illustrated that 60-70% of these students failed to complete the first year of a typical Liberal Arts Curriculum. The program was formulated for a one-year general education experience which includes the following instructional areas: First Semester: Humanities, 3 hours credit; Social Science, 4 hours credit; Communications, 4 hours credit; Natural Science, 4 hours credit; Freshman Seminar, 1 hour credit. Second Semester: Humanities, 3 hours credit; Social Science, 4 hours credit; Communications, 4 hours credit; Natural Science, 4 hours credit; Freshman Seminar, 1 hour credit. The students are scheduled according to the block system (20 students per block) and the instructors who teach the same blocks meet weekly as a vertical team to coordinate and integrate their activities. The Natural Science Course was designed to acquaint the students with science and its application to their everyday life.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PURPOSES AND OBJECTIVES:
1. To develop an awareness of the nature, the methods and certain basic principles of science.
2. To develop an awareness of the orderliness of our physical

and biological environment.
3. To develop an awareness of the contributions of science and their effects on society.
4. To develop the concept that the acquisition of scientific knowledge is the responsibility of every individual in order to become a better informed citizen, so that he is able to interact effectively on the social and political issues of his time.
5. To develop a student who knows man's place in nature in order that he may function better in today's society and knowledgeably participate in the development of society tomorrow.
6. To aid students in the understanding of the place and function of science in their lives.
7. To help the student to understand that science is both a product and a process; it is a body of knowledge and a method of perceiving his environment.
8. To help the student see why science has unique contributions to make to the well being of man.
9. To aid in the development of scientifically literate citizens.
10. To develop student ability in analyzing and evaluating many aspects of scientific information.
11. To develop an understanding of the scientific method and its application to new problems and situations.
12. To develop a scientific vocabulary sufficient to enable the student to understand certain scientific information which he will encounter in his reading of books, magazines, newspapers and some science-oriented journals, as well as presentations made in the movies, radio and television.
13. To help the student, as the semester proceeds, to become able to proceed upward cognitively from work principally at the level of knowledge, recall, and comprehension to the levels of analysis, synthesis, and evaluation.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Programmed instruction; laboratory investigations; lectures; discussion groups.

J. ORIENTATIONS OF STATED OBJECTIVES: Limited content mastery; process acquisition; scientific literacy; understanding social influence of science.

K. LOCATION OF LIST OF OBJECTIVES: Division Progress Report.

L. SPECIFIC SUBJECTS, GRADE AND AGE LEVELS: Physical and biological science integrated through the themes of evolution, man and environment, and the scientific method. College level, transferable science credit for non-science majors.

M. DESCRIPTION OF MATERIALS ALREADY PRODUCED:
1. First semester text: Arnfield, E.A., Demas, G.J., Dassow, D.P., Tomlinson, P. Natural Science, A Course in General Education in Science. Wm. C. Brown Book Company, Dubuque,

Iowa 1967. 212 pages.
2. Natural Science 150 and 160 Course Syllabi.
3. Audio-tutorial unit on Mitosis and Meiosis.
4. Division of Basic Education's Progress Report. Background information dealing with rationale, philosophy and evaluation.

N. MATERIALS AVAILABLE FREE: Items 2 and 4.

O. MATERIALS PURCHASABLE: Item 1 from publisher.

P. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

Q. LANGUAGE IN WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: None.

R. PROJECT IMPLEMENTATION:
1. Number of teachers using materials: 7.
2. Number of students involved: 600.
3. Number of schools involved: 1.
4. Sources of totals in 1, 2, and 3 above: (Not answered).
5. Name and location of specific schools where course is being taught: Macomb County Community College.
6. Availability of consultants for teachers: Not available.

S. PROJECT EVALUATION:
1. Evaluation conducted by: Currently the area faculty, as well as the Evaluation Committee of the Basic Education Division.
2. Instruments used: The staff has developed their own questionnaire.
3. Control groups: Currently Liberal Arts students of comparable abilities are used.
4. Feedback process: Students evaluate the Natural Science Course at the end of each semester in terms of its usefulness and comprehensibility with respect to the lectures, laboratories and instructional materials. Faculty evaluation of all aspects of the curriculum prepared in writing and presented weekly in two-hour weekly discussion periods.
5. Research evidence of objectives achieved: Data on success, longevity in college, number students who transfer to senior institutions.
6. Availability of evidence: In Division Progress Report.

T. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: (Not previously reported).

U. PLANS FOR THE FUTURE: Bring all the present instructional materials to the point of publication. Thoroughly evaluate the present published materials for revision. Develop at least one audio-tutorial sequence per subject-matter segment. Development of pre- and post-testing instruments for evaluation of achievement and cognitive development.

A. PROJECT TITLE: OCEANOGRAPHIC CURRICULUM FOR HIGH SCHOOLS.

B. PROJECT DIRECTOR: Harold W. Dubach, Deputy Director, National Oceanographic Data Center, Washington, D.C. 20390.

C. PROJECT HEADQUARTERS:
1. Contact: Project Director, Oceanographic Curriculum for High Schools.
2. Special facilities or activities available for visitor viewing: Visitors are welcome from 8:00 A.M. to 4:30 P.M. Monday through Friday at the National Oceanographic Center, Building 160, Washington Navy Yard, 2nd and M Streets, S.E., Washington, D.C. The Data Center has a collection of publications about the oceans which are of interest to high school students; some of these are available for free distribution.

D. PRINCIPAL PROFESSIONAL STAFF: No personnel assigned to this project full time.

E. PROJECT SUPPORT: National Oceanographic Data Center.

F. PROJECT HISTORY:
1. Principal originators: Harold W. Dubach, Robert W. Taber, and Leon R. LaPorte.
2. Date and place of initiation: 1967; Washington, D.C.
3. Reason for initiation: In response to requests from high school science teachers for an oceanographic curriculum.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PURPOSES AND OBJECTIVES: To provide a suggested curriculum for including oceanography in high school science courses; to supply information on sources of charts, movies and bibliographies.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Lectures; films.

J. ORIENTATIONS OF STATED OBJECTIVES: Broaden present science courses.

K. LOCATION OF LIST OF OBJECTIVES: Introduction to "A Suggested Oceanographic Curriculum for High Schools".

L. SPECIFIC SUBJECTS, GRADE AND AGE LEVELS: Grades 9 through 12, but may be modified for junior high school or junior college. General introduction to the oceans, their chemistry, physical properties, processes, geology, biology and man's use of the sea.

M. DESCRIPTION OF MATERIALS ALREADY PRODUCED:
1. Suggested Oceanographic Curriculum for High Schools, NODC Progress Report No. 81.
2. Films on Oceanography, NODC Publication C-4, Third Edition.

N. MATERIALS AVAILABLE FREE: Progress reports and lists of publications.

O. MATERIALS PURCHASABLE: Item 2, Films on Oceanography, (Third

Fdition), $0.75.

P. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

Q. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: None.

R. PROJECT IMPLEMENTATION: (Not yet in use.)
1. Availability of consultants for teachers: The National Oceanographic Data Center will answer information requests from teachers.
2. Activities conducted for in-service teacher training: None.

S. PROJECT EVALUATION: The suggested curriculum has been distributed to a limited number of educators for comments.

T. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: (Not previously reported).

U. PLANS FOR THE FUTURE: The suggested curriculum will be revised on the basis of comments now being received and will be made available to anyone interested.

A. PROJECT TITLE: OCEANOGRAPHIC EDUCATION CENTER (O.E.C.).

B. PROJECT DIRECTOR: James C. Kinney, 484 Davisville Road, East Falmouth, Massachusetts 02536. Tel. 617-548-4609.

C. PROJECT HEADQUARTERS:
1. Contact: James C. Kinney, Director O.E.C., Town of Falmouth Public Schools, Oceanographic Education Center, Box 585, Falmouth, Massachusetts 02541. Tel. 617-548-4015.
2. Special facilities or activities available for visitor viewing: Classroom displays, laboratory where students are carrying out oceanographic studies (opening in February), O.E.C. where materials and information are available.

D. PRINCIPAL PROFESSIONAL STAFF: Director; two teachers at center; other teachers involved in writing, teaching, and developing filmstrips, slides, and displays. Woods Hole scientists as consultants.

E. PROJECT SUPPORT:
1. Organizational sponsorships: Town of Falmouth Public Schools in cooperation with Woods Hole Oceanographic Institution, Marine Biological Laboratory, and Bureau of Commercial Fisheries Biological Laboratory.
2. Funding agencies: Title III, Elementary and Secondary Education Act of 1965.

F. PROJECT HISTORY:
1. Principal originators: Town of Falmouth Public Schools in cooperation with Woods Hole Oceanographic Institution, Marine Biological Laboratory, and Bureau of Commercial Fisheries Biological Laboratory.
2. Date and place of initiation: June 1, 1966; Falmouth, Massachusetts.
3. Reason for initiation: Planning grant of Title III Grant of Elementary and Secondary Education Act of 1965.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PURPOSES AND OBJECTIVES: To train teachers and produce teaching units through a unique relationship between teachers and marine scientists at Woods Hole. To teach the various disciplines of science, using oceanography to inter-relate them in an exemplary manner. To develop an Oceanographic Education Center for exhibiting and disseminating teaching aids, methods, and information.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Laboratory investigations, lectures, teacher course "Introduction to Oceanography".

J. ORIENTATIONS OF STATED OBJECTIVES: Content mastery, career guidance, make present knowledge of oceanography available to others.

K. LOCATION OF LIST OF OBJECTIVES: In the Addendum to the Proposal a list of general concepts have been developed for each of the

disciplines of oceanography: namely, biology, geology, chemistry, physics, and meteorology.

L. SPECIFIC SUBJECTS, GRADE AND AGE LEVELS: These are being decided presently, but the staff is concerned presently with sixth, seventh, and eighth grades.

M. DESCRIPTION OF MATERIALS ALREADY PRODUCED: Materials will be ready for general distribution later. Working on units in each of five disciplines. Also working on filmstrip, slide presentations for particular areas.

N. MATERIALS AVAILABLE FREE: None.

O. MATERIALS PURCHASABLE: None.

P. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

Q. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: None.

R. PROJECT IMPLEMENTATION: Numbers of teachers and students and location of schools will be gathered for the May 1 Progress Report. Not available at present.
1. Availability of consultants for teachers: Teachers using materials have had in-service course, and Woods Hole scientists are available for consultation as well as Center personnel.
2. Activities conducted for in-service teacher training: Seven-week course "Introduction to Oceanography" which includes instruction in each discipline and also availability of materials available for teaching principle of oceanography.
3. Implementation procedures in addition to above: Teachers have had a day at sea aboard a research vessel of Woods Hole Oceanographic Institution or Bureau of Commercial Fisheries Biological Laboratory. Films, slides, displays, and specific articles concerning Oceanography.
4. Implementation procedure, seemingly, the most effective: Evaluation must come later.

S. PROJECT EVALUATION: Not available as yet.

T. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: (Not previously reported).

U. PLANS FOR THE FUTURE: (Not answered).

A. PROJECT TITLE: ORANGE COUNTY SCHOOLS MARINE SCIENCE FLOATING LABORATORY, "A HANDS-ON PRACTICE OF SCIENCE".

B. PROJECT DIRECTOR: Ronald B. Linsky, 1104 West 8th Street, Santa Ana, California 92701. Tel. 714-834-3968.

C. PROJECT HEADQUARTERS:

1. Contact: Orange County Superintendent of Schools Office, 1104 West 8th Street, Santa Ana, California 92701. Tel. 714-834-3900.
2. Special facilities or activities available for visitor viewing: 4 hour cruise on board the Fury II, the Marine Science Floating Laboratory, while underway with students observing their "Hands-On Practice of Science".

D. PRINCIPAL PROFESSIONAL STAFF: Ronald L. Schnitger, On Board Instructor.

E. PROJECT SUPPORT:

1. Organizational sponsorship: Orange County Superintendent of Schools Office.
2. Funding agency: ESEA Title III, P.L. 89-10.

F. PROJECT HISTORY:

1. Principal originators: C.H. Kopitzke, G. Farrell, R.B. Linsky, R.L. Schnitger, Instructional Staff, Orange County Superintendent of Schools Office.
2. Date and place of initiation: June 16, 1967; Santa Ana, California.
3. Reason for initiation: As a result of the Pilot Program an educational need was determined relative to the county's proximity to the Pacific Ocean and manpower needs assessment.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PURPOSES AND OBJECTIVES:

1. Utilize all possible talents and resources to develop an unusually valuable and meaningful educational experience for a broad segment of junior and senior high school youth in Orange County.
2. Develop student appreciation and understanding of the sea, and life in the sea as a vast, largely untapped, natural resource.
3. Extend student awareness of the need to apply sound conservation practices in the use of the ocean and its many resources.
4. Provide students with a "hands-on" experience in the handling and use of scientific equipment related to the several branches of marine science.
5. Improve students' understanding for the need to bring the tools and concepts of many scientific disciplines to bear on the problem of investigating the secrets of the sea.
6. Assist students in the investigation of the educational and vocational opportunities associated with marine science.
7. Encourage the development of marine science as a permanent part of educational programs of participating schools and school

districts.
8. Produce materials of instruction for district classroom use, K-12, for orientation, biological and physical science programs.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: On board cruises to investigate oceanology of the waters adjacent to Orange County, California, by "A Hands-On Practice of Science".

J. ORIENTATIONS OF STATED OBJECTIVES: Attitudinal changes, career guidance.

K. LOCATION OF LIST OF OBJECTIVES: Page 12, Application for Operational Program Grant.

L. SPECIFIC SUBJECTS, GRADE AND AGE LEVELS: Oceanology (Physical and Biological) for grades 7-12.

M. DESCRIPTION OF MATERIALS ALREADY PRODUCED:
1. Grant Application.
2. Student Syllabus.
3. Marine Science Newsletter.
4. Teacher Support Packet.
5. Oceanology overlays (transparencies).
6. Program organization charts.

N. MATERIALS AVAILABLE FREE: Items 3 and 6.

O. MATERIALS PURCHASABLE: Item 1, $3.00; Item 2, $1.50; Item 4, $5.00; Item 5, $10.00.

P. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

Q. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: None.

R. PROJECT IMPLEMENTATION:
1. Number of teachers using materials: 250 on board participants (it is projected that 2 or 3 times this figure is possible due to interdepartmental in-service at the local level).
2. Number of students involved: 9,778 (on board participants). This may be doubled or tripled due to in-school contacts with other students (non-participants).
3. Number of schools involved: 104.
4. Sources of totals in 1, 2, and 3 above: Item 1, actual count; Item 2, as of January 26, 1968, 3,778 students have participated, the remainder of the total has been projected; Item 3, actual count.
5. Name and location of specific schools where course is being taught: The Orange County Schools Floating Laboratory, the Fury II, is berthed at Davey's Locker, Newport Beach, California.
6. Availability of consultants for teachers: Available, classroom guest lecturers or in-service workshops for teachers.
7. Activities conducted for in-service teacher training: Orientation meetings for participating teachers prior to their going to sea with their classes.

8. Implementation procedures in addition to above: Evaluation meetings with districts' representatives monthly and semester evaluation meeting by participating teachers.
9. Implementation procedure, seemingly, the most effective: Data not available as of this date.

S. PROJECT EVALUATION:

1. Evaluation conducted by: Dr. Thais Yeremian, Dr. William Turner.
2. Instruments used: Turner-Yeremian Marine Science Inventory.
3. Control groups: None used.
4. Feedback process: Twice weekly questionnaires from students at the termination of their cruise. Monthly planning committee meetings attended by representatives of the participating districts.
5. Research evidence of objectives achieved: Data not available at this date.

T. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: (Not previously reported).

U. PLANS FOR THE FUTURE: It is anticipated that the program can be expanded to provide this unique experience to more students during the second and third year of operation. At the close of the third year it is planned that a multi-district joint powers agreement will be finalized for the continuation of the program.

A. PROJECT TITLE: PATTERNS IN ARITHMETIC (PIA)

B. PROJECT DIRECTOR: Dr. H. Van Engen, Research and Development Center for Cognitive Learning, 1404 Regent Street, Madison, Wisconsin 53706. Tel. 608-262-5866.

C. PROJECT HEADQUARTERS:
1. Contact: Dr. H. Van Engen, PIA, Research and Development Center for Cognitive Learning.
2. Special facilities or activities available for visitor viewing: Studio production, classroom visits and center units.

D. PRINCIPAL PROFESSIONAL STAFF: Robert Parr, TV Teacher and Project Asst.; Walter Leffin, Project Asst.; Kathryn Strangman, Project Asst.; James Braswell, Project Asst.

E. PROJECT SUPPORT:
1. Organizational sponsorship: U.S. Office of Education.
2. Funding agency: U.S. Office of Education.

F. PROJECT HISTORY:
1. Principal Originator: H. Van Engen.
2. Date and place of initiation: 1964; University of Wisconsin.
3. Reason for initiation: In-service education of teachers and modernizing programs.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PURPOSES AND OBJECTIVES: To provide a complete course in arithmetic for the elementary school as a means to re-orient the mathematics program and provide in-service work for teachers.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: TV lessons.

J. ORIENTATIONS OF STATED OBJECTIVES: Content mastery.

K. LOCATION OF LIST OF OBJECTIVES: By writing to director and in teachers' manuals.

L. SPECIFIC SUBJECTS, GRADE AND AGE LEVELS: Grades 1-6, inc.

M. DESCRIPTION OF MATERIALS ALREADY PRODUCED: Grades 1-5 already produced. For each grade there exists a teacher's manual and pupil exercise book.

N. MATERIALS AVAILABLE FREE: General description.

O. MATERIALS PURCHASABLE: National Center for School and College Television, Box A, Bloomington, Indiana.

P. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

Q. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: None

R. PROJECT IMPLEMENTATION:
1. Number of teachers using materials: Approximately 400.
2. Number of students involved: 100,000
3. Number of schools involved: Approximately 100
4. Sources of totals in 1,2 and 3 above: By number of workbooks sold.

A. PROJECT TITLE: PATTERNS IN ARITHMETIC (PIA)

B. PROJECT DIRECTOR: Dr. H. Van Engen, Research and Development Center for Cognitive Learning, 1404 Regent Street, Madison, Wisconsin 53706. Tel. 608-262-5866.

C. PROJECT HEADQUARTERS:
1. Contact: Dr. H. Van Engen, PIA, Research and Development Center for Cognitive Learning.
2. Special facilities or activities available for visitor viewing: Studio production, classroom visits and center units.

D. PRINCIPAL PROFESSIONAL STAFF: Robert Parr, TV Teacher and Project Asst.; Walter Leffin, Project Asst.; Kathryn Strangman, Project Asst.; James Braswell, Project Asst.

E. PROJECT SUPPORT:
1. Organizational sponsorship: U.S. Office of Education.
2. Funding agency: U.S. Office of Education.

F. PROJECT HISTORY:
1. Principal Originator: H. Van Engen.
2. Date and place of initiation: 1964; University of Wisconsin.
3. Reason for initiation: In-service education of teachers and modernizing programs.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PURPOSES AND OBJECTIVES: To provide a complete course in arithmetic for the elementary school as a means to re-orient the mathematics program and provide in-service work for teachers.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: TV lessons.

J. ORIENTATIONS OF STATED OBJECTIVES: Content mastery.

K. LOCATION OF LIST OF OBJECTIVES: By writing to director and in teachers' manuals.

L. SPECIFIC SUBJECTS, GRADE AND AGE LEVELS: Grades 1-6, inc.

M. DESCRIPTION OF MATERIALS ALREADY PRODUCED: Grades 1-5 already produced. For each grade there exists a teacher's manual and pupil exercise book.

N. MATERIALS AVAILABLE FREE: General description.

O. MATERIALS PURCHASABLE: National Center for School and College Television, Box A, Bloomington, Indiana.

P. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

Q. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: None

R. PROJECT IMPLEMENTATION:
1. Number of teachers using materials: Approximately 400.
2. Number of students involved: 100,000
3. Number of schools involved: Approximately 100
4. Sources of totals in 1,2 and 3 above: By number of workbooks sold.

5. Name and location of specific schools where course is being taught: In Alabama, Wisconsin, Minnesota and South Carolina.
6. Availibility of consultants for teachers: Yes.
7. Activities conducted for in-service teacher training: Minimal amount.
8. Implementation procedures in addition to those above: Not answered.
9. Implementation procedure seemingly the most effective: Not answered.
10. How evaluated: Yes. Not described.

S. PROJECT EVALUATION:
1. Evaluation conducted by: ETS and the R & D Center at University of Wisconsin.
2. Instruments used: ETS and California Standardized tests as well as our own.
3. Selection of control groups: None used.
4. Feedback process: Teacher opinionnaires and teacher conferences.
5. Research evidence of objectives achieved: Only on standardized tests.
6. Availability of evidence: Yes, write to director.

T. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: Grade 5 produced and field testing of 1 and 3 completed.

U. PLANS FOR THE FUTURE: Produce Grade 6.

A. PROJECT TITLE: PHYSICAL SCIENCE FOR NONSCIENCE STUDENTS (PSNS).

B. PROJECT DIRECTORS: Prof. Lewis Bassett, Department of Chemistry, Rensselaer Polytechnic Institute, Troy, New York 12181. Tel. 518-270-6341. Prof. Walter Eppenstein, Department of Physics, Rensselaer Polytechnic Institute, Troy, New York 12181. Tel. 518-270-6310.

C. PROJECT HEADQUARTERS:
1. Contact: Prof. Lewis Bassett, PSNS Project, Rensselaer Polytechnic Institute, Troy, New York 12181. Tel. 518-270-6341.
2. Special facilities or activities available for visitor viewing: None.

D. PRINCIPAL PROFESSIONAL STAFF: Lewis Bassett, Co-director; Walter Eppenstein, Co-director; Arnold A. Strassenburg, Associate Director and Chairman of Advisory Board; Elizabeth A. Wood, Associate Director; Robert R. Sells, Associate Director; Stuart Inglis, Staff Scientist.

E. PROJECT SUPPORT:
1. Organizational sponsorships: Commission on College Physics; Advisory Council on College Chemistry.
2. Funding agency: National Science Foundation.

F. PROJECT HISTORY:
1. Principal originators: Commission on College Physics; Advisory Council on College Chemistry.
2. Date and place of initiation: April 1965; Rensselaer Polytechnic Institute.
3. Reason for initiation: To satisfy a need for a one-year, laboratory-oriented course in physical science for prospective elementary school teachers.

G. PRESENT COMMERCIAL AFFILIATIONS: Textbook publisher: John Wiley and Sons, Inc., New York City. Apparatus supplier: Damon Educational, Inc., Needham, Massachusetts.

H. PURPOSES AND OBJECTIVES: The objective is to produce materials for a one-year laboratory-oriented, college level physical science course for nonscience majors. The course is unique in three respects: (1) the topics discussed all contribute to the development of a single theme -- the structure of solids; by restricting the breadth of coverage it is possible to achieve significant depth at a pace which is realistic for students without strong backgrounds in science and mathematics; (2) the style of treatment involves observation of physical phenomena, hypothesizing on models appropriate for understanding experimental results, and logical analysis to determine the adequacy of the models in the light of additional experiments. This direct experience in employing the experimental method contributes to an appreciation of the power of science and helps to develop the student's confidence in his own ability to ask and answer scientific questions intelligently; (3) the subject matter selected and the style of treatment lend themselves to a truly integrated physical science course. The sense of

unity and purpose in the approach is more pervasive than are the remnants of the conventional viewpoints of specific disciplines.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Laboratory investigations; discussion groups.

J. ORIENTATIONS OF STATED OBJECTIVES: Process acquisition; attitudinal changes; scientific literacy.

K. LOCATION OF LIST OF OBJECTIVES: A list of objectives is available on request from any of the Directors.

L. SPECIFIC SUBJECTS, GRADE AND AGE LEVELS: Physical science: an integrated course including topics from chemistry and physics. Appropriate for some groups of college freshmen.

M. DESCRIPTION OF MATERIALS ALREADY PRODUCED:
1. Mainstem text (also serves as laboratory manual). Third preliminary edition published in two volumes by Wiley.
2. Teachers' Resource Book. Preliminary edition available in two volumes from project directors.
3. Supplementary Chapters. Treatments of several topics compatible with, but not essential to, the development of the Mainstem. Available from project directors.
4. Three newsletters. Available from project directors.
5. Apparatus for performing experiments and demonstrations described in the text.

N. MATERIALS AVAILABLE FREE: Items 2, 3, and 4 are available free from Prof. Lewis Bassett, Department of Chemistry, Rensselaer Polytechnic Institute, Troy, New York 12181.

O. MATERIALS PURCHASABLE: Items 1 and 5 can be purchased. Orders for both text and apparatus should be placed with John Wiley and Sons, Inc., 605 Third Avenue, New York, New York 10016. Order forms including complete price list can be obtained from John Wiley and Sons.

P. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

Q. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: No plans.

R. PROJECT IMPLEMENTATION:
1. Number of teachers using materials: Approximately 40 in 1967-1968.
2. Number of students involved: Approximately 2,000 in 1967-1968.
3. Number of schools involved: Approximately 40 in 1967-1968.
4. Sources of totals in 1, 2, and 3 above: From records kept by Wiley on sales of textbooks.
5. Name and location of specific schools where course is being taught: Nassau Community College, Garden City, New York; Green Mountain College, Poultney, Vermont; State College of Arkansas, Conway, Arkansas; Ohio State University, Columbus, Ohio.

6. Availability of consultants for teachers: Arrangement can be made on a limited basis for consultants to work with prospective teachers. These services are available to groups of colleges who collectively organize a briefing session. A PSNS staff member will conduct such sessions.
7. Activities conducted for in-service teacher training: None at present.
8. Implementation procedures in addition to above: Summer institutes supported by the National Science Foundation for college physical science teachers were offered at RPI during the summers of 1967 and 1968. The philosophy of the course and effective methods of presentation, as well as background subject matter in chemistry and physics were discussed.
9. Implementation procedure, seemingly, the most effective: A one-week briefing session can be effective for well prepared teachers. Summer institutes are extremely useful for teachers who need additional work in chemistry or physics.
10. How evaluated: Subjective impressions of teaching staff and comments from participants.

S. PROJECT EVALUATION:
1. Evaluation conducted by: Educational Testing Service.
2. Instruments used: Pre-tests: STEP Science 2B (Part 1); Student Attitude Questionnaire, Form A (developed by ETS for this purpose); Student Biographical Questionnaire (developed by PSNS and ETS staffs). Post-tests: STEP Science 2B (Part 2); Student Attitude Questionnaire, Form B; Teacher Questionnaire (developed by ETS and PSNS staffs); TOUS, an ETS test.
3. Control groups: Yes. Each college selected for evaluation operates a section of a conventional physical science course in parallel with a section of PSNS. Students are randomly assigned to these two sections.
4. Feedback process: During the first two years of trials, feedback was obtained on forms prepared by the PSNS staff approximately every two weeks. Feedback sessions of two to five days in length where teachers made direct oral reports and the effectiveness of the materials were examined in detail were held at the end of each semester.
5. Research evidence of objectives achieved: Evidence to date is all subjective.
6. Availability of evidence: Available. The directors are willing to discuss the course development with interested parties and will share correspondence with teachers and students which consists in part of numerous testimonials.

T. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: Test materials have been revised again. Teacher's Resource Book has been completed in preliminary form and is being tested. Additional supplementary chapters have been completed and are being tested. Two summer institutes for prospective teachers were held. Arrangements for controlled evaluation to be conducted by ETS were made.

U. PLANS FOR THE FUTURE: During the final summer work session in 1968, the text will be put in final form, the Teacher's Resource Book will be revised, and additional supplementary chapters will be completed. The evaluation proposed by ETS will be conducted during academic year 1968-1969. The final version of the text will become available in the spring of 1969. Final versions of other materials will follow.

A. PROJECT TITLE: PORTLAND PROJECT - AN INTEGRATION OF BIOLOGY, CHEMISTRY AND PHYSICS.

B. PROJECT DIRECTOR: Dr. Karl Dittmer, Dean School of Science, Portland State College, P.O. Box 751, Portland, Oregon 97207.

C. PROJECT HEADQUARTERS:
1. Contact: Dr. Michael Fiasca, Co-Director Portland Project, Portland State College, P.O. Box 751, Portland, Oregon 97207. Tel. 503-226-7271, ext. 1291.
2. Special facilities or activities available for visitor viewing: Pilot school classes.

D. PRINCIPAL PROFESSIONAL STAFF: Karl Dittmer, Director; Michael Fiasca, Co-Director; Arthur Scott, Executive Committee; Donald Stotler, Executive Committee.

E. PROJECT SUPPORT:
1. Organizational sponsorships: Portland State College; Reed College; Beaverton School Dist., Beaverton, Oregon; Milwaukie School Dist., Milwaukie, Oregon; Portland School District, Portland, Oregon.
2. Funding agencies: National Science Foundation; Beaverton School District; Milwaukie School District; Portland School District; Portland State College.

F. PROJECT HISTORY:
1. Principal originators: This project is an outgrowth of earlier work by the Portland Project Committee when an integration of chemistry and physics was effected. Dr. Vernon Cheldelin; Dr. Michael Fiasca; Dr. Arthur Scott; Dr. Donald Stotler.
2. Date and place of initiation: August 1966; Portland, Oregon.
3. Reason for initiation: To improve the science curriculum in secondary schools.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PURPOSES AND OBJECTIVES:
1. To develop a three year integrated biology, chemistry, physics sequence for secondary schools mostly from existing materials, such as: IPS, BSCS, CHEM & PSSC.
2. To equip students with some of the skills and modes of behavior that characterize the working scientist.
3. To capture students' interest and enthusiasm for later encounters with science.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study; laboratory investigations; lectures; discussion groups.

J. ORIENTATIONS OF STATED OBJECTIVES: Content mastery; process acquisition; attitudinal changes; scientific literacy.

K. LOCATION OF LIST OF OBJECTIVES: In the "Three Year Course Rationale" set out in the Teachers Guide.

L. SPECIFIC SUBJECTS, GRADE AND AGE LEVELS: Biology, chemistry, physics. A three year sequence for secondary schools.

M. DESCRIPTION OF MATERIALS ALREADY PRODUCED:
1. Biology, Chemistry, Physics - Teachers Guide, Part I & II.
2. Biology, Chemistry, Physics - Teachers Guide, Part III & IV.
3. Biology, Chemistry, Physics - Students Guide, Part I & II.
4. Biology, Chemistry, Physics - Students Guide, Part III & IV.
5. Excerpts from the Teacher Guide.

N. MATERIALS AVAILABLE FREE: Items 5 available from project headquarters.

O. MATERIALS PURCHASABLE: None as yet.

P. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

Q. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: (Not answered).

R. PROJECT IMPLEMENTATION:
1. Number of teachers using materials: 15.
2. Number of students involved: 550.
3. Number of schools involved: 8.
4. Sources of totals in 1, 2, and 3 above: All schools are part of a pilot venture that reports progress semi-monthly.
5. Name and location of specific schools where course is being taught: Portland, Oregon High Schools: Benson High School, Cleveland High School, Franklin High School, Jefferson High School, Roosevelt High School, Wilson High School; Beaverton High School, Beaverton, Oregon; Rex Putnam High School, Milwaukie, Oregon.
6. Availability of consultants for teachers: (Not answered).
7. Activities conducted for in-service teacher training: Teachers meet semi-monthly in Portland, Oregon to assist them with instruction and to review progress.
8. Implementation procedures in addition to above: A summer institute will be devoted to orientation of teachers in 1968.

S. PROJECT EVALUATION:
1. Evaluation conducted by: Dr. George Ingebo, Director of Research and Supervisor of Testing, Portland School District; Dr. Dean Forbes; and a committee of pilot teachers.
2. Instruments used: Presently being designed; include I.P.S., BSCS, CHEM, PSSC test items.
3. Control groups: Not used as yet.
4. Feedback process: Not defined as yet.
5. Research evidence of objectives achieved: None as yet.

T. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: (Not previously listed).

U. PLANS FOR THE FUTURE: 1967-1968, development of evaluation study; summer 1968, writing session to continue development of 2nd and 3rd year materials; summer 1968, Teacher Training Institute; 1968-1969, continuation of pilot study in schools.

A. PROJECT TITLE: A PROGRAM FOR MATHEMATICALLY UNDERDEVELOPED PUPILS.

B. PROJECT DIRECTOR: Dr. Jack L. Foley, Building S-503, Sixth Street North, West Palm Beach, Florida 33401. Tel. 683-0050.

C. PROJECT HEADQUARTERS:

1. Contact: Dr. Jack L. Foley, A Program for Mathematically Underdeveloped Pupils.
2. Special facilities or activities available for visitor viewing: Arrangements can usually be made to visit classes in which the program is being implemented. A Tuesday visit could include a visit to the in-service teachers' class, 4:30-7:30 P.M.

D. PRINCIPAL PROFESSIONAL STAFF: Elizabeth Basten, Administrative Assistant; Ruth Bower, Assistant Coordinator; Gerald Burke, Assistant Coordinator; Wayne Jacobs, Assistant Coordinator; Leroy B. Smith, Mathematics Coordinator for Palm Beach County, Florida.

E. PROJECT SUPPORT:

1. Organizational sponsorship: Palm Beach County Board of Public Instruction.
2. Funding agencies: Title III, PL 89-10 ESEA and Palm Beach County Board of Public Instruction.

F. PROJECT HISTORY:

1. Principal originators: Dr. Jack L. Foley and Mr. Leroy B. Smith.
2. Date and place of initiation: August 1966; Palm Beach County, Florida.
3. Reason for initiation: To develop a program which will better meet the needs and interests of the average and below average student in math.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PURPOSES AND OBJECTIVES:

1. Develop appropriate materials that make for a truly effective learning situation for non-college preparatory students.
2. Develop techniques for measuring teacher and student changes in attitudes resulting from this curriculum innovation.
3. Determine whether success in the program has an influence on the dropout rate in mathematics and from school.
4. Evaluate results by testing, comparing effectiveness of techniques, counselor-student interviews, parent questionnaires and reactions of people not connected with the program.
5. Give these students an appreciation for and a knowledge of mathematics.
6. Develop criteria to identify students achieving below their indicated potential as opposed to students who normally learn at a slow rate.
7. To diagnose the mathematical deficiencies of individual pupils to the end that specific causes for the deficiencies might be revealed and corrective teaching may be instituted.

The project has attempted, and succeeded to a considerable

extent, to add prestige to a part of the mathematics curriculum that previously was totally without prestige. By inserting topics which were previously restricted to the college preparatory program, structuring to a considerable degree, and inserting high interest topics, the project is well on its way to establishing a mathematics program that is appropriate for a large part of the secondary school population. The project staff believes that, with high interest topics and prestige associated with the basic mathematics program, students and teachers will exert a greater effort in their mathematical endeavors.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study; laboratory investigations; lectures; a sequence of steps which includes diagnostic test, appropriate unit of study, self-test, teacher test.

J. ORIENTATIONS OF STATED OBJECTIVES: Content mastery; process acquisition; attitudinal changes; scientific literacy.

K. LOCATION OF LIST OF OBJECTIVES: Pamphlet: Project Mathematics, A Program For Mathematically Underdeveloped Pupils.

L. SPECIFIC SUBJECTS, GRADE AND AGE LEVELS: Non-college preparatory mathematics, grades 7-12.

M. DESCRIPTION OF MATERIALS ALREADY PRODUCED:

1. Pamphlet: Project Mathematics--A Program For Mathematically Underdeveloped Pupils.
2. Price list of available units.
3. Action With Whole Numbers.
4. Action With Fractions--Addition and Subtraction.
5. Action With Fractions--Multiplication.
6. Action With Fractions--Division.
7. Percent Fractions.
8. Metric Geometry--Concepts of Linear Measure.
9. Metric Geometry--Concepts of Area Measure.
10. Volume and Surface Area.
11. Squares, Square Roots and Right Triangles.
12. Angles--Measures.
13. Similarity.
14. Curves, Vertices, Knots and Such (Topology Ideas).
15. Events and Chance.
16. Arrangements and Combinations.
17. Sets, Sub-sets and Operations.
18. Divisibility Tests.
19. Modulo 7.
20. Ideas From Number Theory.
21. Number Sentences.
22. Integers, Addition and Subtraction.
23. Patterns, Particulars, and Guesses.
24. Numeration Systems.
25. Maneuvers on a Geo-Board.
26. The Math Go-Round (Contains many divisibility tests and

pattern-type activities).
27. Slide Rule Activities.
28. Monroe Calculator Activities.
29. Olivetti Calculator Activities.
30. Olivetti Supplementary - Calculator Activities.

N. MATERIALS AVAILABLE FREE: Items 1 and 2 from project headquarters.

O. MATERIALS PURCHASABLE: Cost given is price per unit. Item 3, $0.40; Items 4, 7, 21, 28, $0.26; Items 5, 24, $0.21; Items 6, 19, $0.14; Item 8, $0.38; Item 9, $0.28; Items 10, 11, 12, 18, $0.24; Item 13, $0.39; Item 14, $0.27; Item 15, $0.16; Item 16, $0.50; Item 17, $0.30; Item 20, $0.33; Item 22, $0.25; Items 23, 25, 26, $0.20; Item 27, $0.22; Item 29, $0.45; Item 30, $0.17.

P. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

Q. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: None.

R. PROJECT IMPLEMENTATION:
1. Number of teachers using materials: 34.
2. Number of students involved: 2,000.
3. Number of schools involved: 27.
4. Sources of totals in 1, 2, and 3 above: Teachers participate in the project on a voluntary basis. One teacher was selected from each of the secondary schools of Palm Beach County which filed an application. In addition to the 23 teachers selected in this manner, 11 teachers who participated in the project during the 1966-1967 school year were selected to participate again. The 23 teachers participating for the first time in the project were permitted to use project materials in two of their non-college preparatory mathematics classes while the second year project teachers were given sufficient materials to use in each of their classes.
5. Name and location of specific schools where course is being taught: All the schools in which the materials are being used are located in Florida. The following is a partial listing: Belle Glade Jr. High School, Lake Shore Jr. High in Belle Glade; Boynton Beach Jr. High, Poinciana School in Boynton Beach; Delray Beach Jr. High, Seacrest High School in Delray Beach; Lake Worth Junior High and Senior High in Lake Worth; Cardinal Newman High School, Roosevelt Jr.-Sr. High School in West Palm Beach.
6. Availability of consultants for teachers: Available. The three assistant coordinators aid the classroom teachers by lecturing, giving individual instruction to students, and presenting topics to the classes.
7. Activities conducted for in-service teacher training: The 34 teachers attend class one night a week for the entire school year. They receive college credit for 2 courses. The in-service class is used to develop and disseminate materials, ideas and techniques. This development of materials, ideas, and techniques is a joint effort between the classroom teachers and the project staff.
8. Implementation procedures in addition to above: None.

S. PROJECT EVALUATION:

1. Evaluation conducted by: Evaluation is limited to developmental purposes.
2. Instruments used: Instrument developed by project staff.
3. Control groups: None are appropriate at this time.
4. Feedback process: Primarily classroom teachers, students, consultants and other school systems.
5. Research evidence of objectives achieved: At this developmental stage, only evidence obtained from instruments and consultant observations.
6. Availability of evidence: Available from project headquarters.

T. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: (Not previously reported).

U. PLANS FOR THE FUTURE:

1. To continue project in grades 7-12 with special emphasis on evaluation.
2. To extend the project to cover grades 5 and 6.
3. To hold a 6 weeks summer school dissemination center with one teacher from each of the 50 states of U.S. attending.
4. To establish similar programs in 8 other Florida counties.

A. PROJECT TITLE: PSSC ADVANCED TOPICS PROGRAM.

B. PROJECT DIRECTOR: Uri Haber-Schaim, Education Development Center, 55 Chapel Street, Newton, Massachusetts 02160. Tel. 617-969-7100.

C. PROJECT HEADQUARTERS:
1. Contact: PSSC Advanced Topics Program.
2. Special facilities or activities available for visitor viewing: None.

D. PRINCIPAL PROFESSIONAL STAFF: A number of persons have worked on the project over a period of years. Acknowledgements are given in the preface to the textbook.

E. PROJECT SUPPORT:
1. Organizational sponsorship: Education Development Center.
2. Funding agency: National Science Foundation.

F. PROJECT HISTORY:
1. Principal originator: The preface to the textbook gives acknowledgements.
2. Date and place of initiation: 1962; Educational Services Incorporated.
3. Reason for initiation: See Section H.

G. PRESENT COMMERCIAL AFFILIATIONS: D.C. Heath and Company, 285 Columbus Avenue, Boston, Mass. 02116; Macalaster Scientific Corp., 186 Third Ave., Waltham, Mass. 02154; Science Electronics, 1085 Commonwealth Ave., Boston, Mass. 02215; Modern Learning Aids, 1212 Avenue of the Americas, New York, N.Y. 10035.

H. PURPOSES AND OBJECTIVES: The Advanced Topics Supplement takes up additional fundamental ideas and is meant to serve as an extension of the PSSC course into a three-semester or two-year course in high school or to be used as part of an introductory course in college.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Laboratory investigations, lectures, discussion groups.

J. ORIENTATIONS OF STATED OBJECTIVES: Content mastery, process acquisition, scientific literacy.

K. LOCATION OF LIST OF OBJECTIVES: (Not answered).

L. SPECIFIC SUBJECTS, GRADE AND AGE LEVELS: Angular momentum, statistical mechanics, special relativity and quantum physics for use in high school or an introductory college course.

M. DESCRIPTION OF MATERIALS ALREADY PRODUCED:
1. Text: includes laboratory guide.
2. Teacher's Guide.
3. Laboratory apparatus.
4. Films.

N. MATERIALS AVAILABLE FREE: None.

O. MATERIALS PURCHASABLE: Item 1, $3.80; D.C. Heath & Co., 285 Columbus Avenue, Boston, Mass. 02116. Item 2, $3.80; D.C. Heath and Company, 285 Columbus Avenue, Boston, Mass. 02116. Item 3, prices vary; catalogues can be obtained from: Macalaster Scientific Corp., 186 Third Avenue, Waltham, Mass. 02154; or Science Electronics, 1085 Commonwealth Ave., Boston, Mass. 02215. Item 4, prices vary; catalogue can be obtained from Modern Learning Aids, 1212 Avenue of the Americas, New York, N.Y. 10036.

P. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

Q. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: Japanese.

R. PROJECT IMPLEMENTATION: The number of teachers and students using materials is unknown. The project does not provide consultant service or organize in-service training activities.

S. PROJECT EVALUATION: (Not answered).

T. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: Achievement tests have been prepared for all chapters and are being prepared for publication by Educational Testing Services, Princeton, New Jersey 08540.

U. PLANS FOR THE FUTURE: Phase out.

A. PROJECT TITLE: RADIATION SCIENCE SEMINAR.

B. PROJECT DIRECTOR: John W. Sulcoski, 80 N. Washington Street, Wilkes-Barre, Pennsylvania 18701. Tel. 717-825-6881, ext. 247.

C. PROJECT HEADQUARTERS:
1. Contact: John W. Sulcoski, Project Director, Radiation Science Seminar.
2. Special facilities or activities available for visitor viewing: Viewing of exemplary program, July 1968.

D. PRINCIPAL PROFESSIONAL STAFF: John W. Sulcoski, Director; Stephen Rituper, Jr., Vice-Director; H. Bruce Geiger, Lecturer; William Sharkan, Evaluation and Writing Coordinator; Frank J. Wempa and William J. Murray, Lab Directors.

E. PROJECT SUPPORT:
1. Organizational sponsorship: Wilkes-Barre City School District.
2. Funding agencies: U.S. Office of Education - H.E.W. Title III ESEA.

F. PROJECT HISTORY:
1. Principal originators: John W. Sulcoski and Stephen Rituper.
2. Date and place of initiation: Wilkes-Barre, Pennsylvania.
3. Reason for initiation: See Section H below.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PURPOSES AND OBJECTIVES:
1. Develop a curriculum guide and instructional materials for use in nuclear and radiation science as a senior high school honors elective.
2. Develcp nuclear science filmstrips and videotapes.
3. Train teachers in nuclear techniques.
4. Develop exemplary program.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study; laboratory investigations; lectures; seminars; discussion groups.

J. ORIENTATIONS OF STATED OBJECTIVES: Content mastery; process acquisition; attitudinal changes.

K. LOCATION OF LIST OF OBJECTIVES: Project Proposal.

L. SPECIFIC SUBJECTS, GRADE AND AGE LEVELS: Nuclear Science, Interdisciplinary, grade 11-12.

M. DESCRIPTION OF MATERIALS ALREADY PRODUCED:
1. Nuclear Science Curriculum Guide, ready by February 28, 1968.
2. Filmstrips on Nuclear Lab techniques (captioned type).
   a. Autoradiography.
   b. Sample Preparation.
   c. Radiation Biology - Wet Ashing Techniques.
   d. Paper Radiochromatography.
   e. Radiation Safety in the Laboratory.

f. Radiological Monitoring in the Laboratory.
g. Securing Inexpensive Nuclear Accessories.

N. MATERIALS AVAILABLE FREE: Item 1 as long as printing holds

O. MATERIALS PURCHASABLE: Items 2a-g will be duplicated on custom basis by project director $5.00 each or $30.00 per set. Available from project headquarters. This arrangement is temporary until commercially available, possibly in 1969.

P. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

Q. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: None.

R. PROJECT IMPLEMENTATION:
1. Number of teachers using materials: 26.
2. Number of students involved: 26.
3. Number of schools involved: 12.
4. Sources of totals in 1, 2, and 3 above: Actual count.
5. Name and location of specific schools where course is being taught: James M. Coughlin High School, Wilkes-Barre, Pennsylvania.
6. Availability of consultants for teachers: Available; will develop program tailored to district for 12th grade nuclear science.
7. Activities conducted for in-service teacher training: Conducted nuclear science training for teachers; provided nuclear science workshops and seminars in area.

S. PROJECT EVALUATION:
1. Evaluation conducted by: Dr. Frank X. Sutman, 262 Ritter Hall, Temple University, Philadelphia, Pennsylvania.
2. Instruments used: Pre-test, post-test, personal contact, interview and questionnaire.
3. Control groups: Yes, chosen by Duquesne University in conjunction with consultant staff.
4. Feedback process: Questionnaire and visit.
5. Research evidence of objectives achieved: None at the moment.
6. Availability of evidence: Writer to director in 1969.

T. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: (Not previously reported).

U. PLANS FOR THE FUTURE: Phase out summer 1968.

A. PROJECT TITLE: RADIOISOTOPES AND INQUIRY.

B. PROJECT DIRECTOR: J.L. Rips, Vice President, Bio-Atomic Research Foundation, 12020 Chandler Blvd., North Hollywood, Calif. Tel. 213-766-3926 or 213-877-0993.

C. PROJECT HEADQUARTERS:
1. Contact: J.L. Rips, Radioisotopes and Inquiry.
2. Special facilities or activities available for visitor viewing: (Not answered).

D. PRINCIPAL PROFESSIONAL STAFF: Alan Keltz, Technical consultant; Simon Kinsman, Technical consultant; Benedict Cassen, Technical consultant. Group directors: Norman Faber, A.V. Mayrhofer. Consultants: Barbara K. Hopper, Jay E. Howell, Ralph T. Clarkson.

E. PROJECT SUPPORT:
1. Organizational sponsorship: U.S. Atomic Energy Commission.
2. Funding agency: U.S. Atomic Energy Commission.

F. PROJECT HISTORY:
1. Principal originators: J.L. Rips, Victor Aleck, Alan Keltz, John R. Rowe.
2. Date and place of initiation: 1963; North Hollywood, California.
3. Reason for initiation: Student and teacher interest in radioisotopic techniques as a supplementary learning and teaching tool.

G. PRESENT COMMERCIAL AFFILIATIONS: (Not answered).

H. PURPOSES AND OBJECTIVES: To prepare and evaluate by field trial:
1. Selected investigations and supplementary information aimed toward the utilization of radioisotopes and radioisotopic techniques as investigative tools in the high school classroom.
2. A supplementary publication for use by teachers in connection with H1.
3. To produce positive attitudinal changes in the student population toward an awareness and acceptance of the peaceful uses of radioactive materials and atomic energy.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study; laboratory investigations; lectures.

J. ORIENTATIONS OF STATED OBJECTIVES: Content mastery; attitudinal changes; scientific literacy.

K. LOCATION OF LIST OF OBJECTIVES: Will appear in published version of texts.

L. SPECIFIC SUBJECTS, GRADE AND AGE LEVELS: Biology, grades 10-12.

M. DESCRIPTION OF MATERIALS ALREADY PRODUCED:
1. Student Text.
2. Teacher Commentary.

N. MATERIALS AVAILABLE FREE: None.

O. MATERIALS PURCHASABLE: Negotiations currently under way for commercial production and distribution of texts and ancillary materials.

P. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

Q. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: (Not answered).

R. PROJECT IMPLEMENTATION:

1. Number of teachers and students using materials: The formal tryout phase of this program was completed during the school year 1966-1967 so that the staff does not have available firm figures as to the present utility of the materials. The staff does know, however, that those schools which were involved in the program last year are continuing.
2. Availability of consultants for teachers: A consultant cadre is being recruited from the personnel which were involved in the development. Inquiries for such services will be accepted by the Foundation for the time being.
3. Activities conducted for in-service teacher training: See R2 above.

S. PROJECT EVALUATION: Completed (no additional information supplied).

T. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: Pre-publication editing of text material. Negotiations for commercial production and distribution of text and ancillary materials.

U. PLANS FOR THE FUTURE: Redesign of techniques and texts for grades 8 and 9 as well as upgrading materials for junior college use.

A. PROJECT TITLE: SAN ANTONIO LANGUAGE BILINGUAL TEACHING PROJECT.

B. PROJECT DIRECTOR: Dr. Thomas D. Horn, 110 Sutton Hall, The University of Texas at Austin, Austin, Texas 78712. Tel. GR1-5942.

C. PROJECT HEADQUARTERS:
1. Contact: Dr. Thomas D. Horn, San Antonio Language Bilingual Teaching Project.
2. Special facilities or activities available for visitor viewing: Visits to classrooms in the Project are possible if requests are submitted in advance.

D. PRINCIPAL PROFESSIONAL STAFF: Thomas D. Horn, Director, University of Texas; Elizabeth H. Ott, Associate Director, Southwest Educational Development Laboratory; Raymond Arnold, Associate Director, Assistant Superintendent, San Antonio Independent School District.

E. PROJECT SUPPORT: Southwest Educational Development Laboratory/ Research and Development Center and Department of Curriculum and Instruction, The University of Texas at Austin. San Antonio Independent School District (Title I funds).

F. PROJECT HISTORY:
1. Principal originator: Dr. Thomas D. Horn.
2. Date and place of initiation: September 1964; San Antonio, Texas.
3. Reason for initiation: To improve language and reading of disadvantaged Mexican-American children learning English as a second language.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PURPOSES AND OBJECTIVES: To improve the learning potential of disadvantaged Mexican-American children by improving their oral language. The scope of the content has been widened to include self-concept development and social studies as well as science. Plans are to include a wider curriculum as the project progresses. The language component of the project utilizes techniques developed in the field of teaching English as a second language. The highly structured language dialogues emphasize development of both syntactical and phonological elements in the English language, thereby giving the children an English language repertoire while reducing problems associated with dialect. A unique and distinctive feature of the project is that the children are learning--concomitantly--content from the school curriculum and the language skills relevant to that content area. Two quite different but pedagogically sound teaching styles are used.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Inquiry - "discovery" for science; didactic - direct for language.

J. ORIENTATIONS OF STATED OBJECTIVES: Content mastery; process acquisition; attitudinal changes; growth in oral English;

growth in reading.

K. LOCATION OF LIST OF OBJECTIVES: With each lesson plan. Broader objectives are found in each major report.

L. SPECIFIC SUBJECTS, GRADE AND AGE LEVELS: Currently science, social studies, reading (pilot), in various stages from grades 1 through 4.

M. DESCRIPTION OF MATERIALS ALREADY PRODUCED:
1. Capsule description.
2. Bibliography.
3. Major Reports (listed in bibliography).

N. MATERIALS AVAILABLE FREE: Items 1 and 2.

O. MATERIALS PURCHASABLE: Item 3.

P. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English and Spanish.

Q. LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: English, Spanish, and French.

R. PROJECT IMPLEMENTATION:
1. Number of teachers using materials: 126.
2. Number of students involved: 3,150.
3. Number of schools involved: 8.
4. Sources of totals in 1, 2, and 3 above: 1) Counting; 2) Multiplying 1x25; 3) Counting.
5. Name and location of specific schools where course is being taught: San Antonio Independent School District.
6. Availability of consultants for teachers: Advanced study (NDEA Institutes); pre-service workshop; in-service meetings monthly; classroom consultants.

S. PROJECT EVALUATION:
1. Evaluation conducted by: Richard D. Arnold.
2. Instruments used: Individual and group achievement and intelligence tests appropriate for each grade level.
3. Control groups:
   a. Science, no language; comparable socio-economic and language group.
   b. "Typical" San Antonio classes i.e. multi-ethnic and socio-economic levels.
4. Feedback process: Contained in major reports.
5. Research evidence of objectives achieved: See major reports available from Director; second year findings seem most appropriate.
6. Availability of evidence: Available, see Bibliography.

T. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: Inclusion of social studies in the content taught to a new group of first and second graders.

U. PLANS FOR THE FUTURE: Continuation and expansion of in-service program; development of reading materials relevant to experiences, content and language of the project; construction of instruments designed to assess language, reading and self-concept.

A. PROJECT TITLE: SCHOOL MATHEMATICS STUDY GROUP (SMSG)

B. PROJECT DIRECTOR: Dr. E. G. Begle, SMSG - Cedar Hall, Stanford University, Stanford, California 94305. Tel. 415-321-2300, ext. 2912.

C. PROJECT HEADQUARTERS:
1. Contact: Project Director, SMSG.
2. Special facilities or activities available for visitor viewing: There are no facilities for visitors.

D. PRINCIPAL PROFESSIONAL STAFF: James Wilson, Project Coordinator, Research and Analysis; Anneli Lax, Executive Editor, Monograph Project.

E. PROJECT SUPPORT:
1. Organizational sponsorships: Stanford University and the Conference Board of the Mathematical Sciences.
2. Funding agency: National Science Foundation.

F. PROJECT HISTORY:
1. Principal originator: Ad hoc Conference of Mathematicians.
2. Date and place of initiation: March 1958; Yale University.
3. Reason for initiation: To bring together classroom teachers and research mathematicians in a joint effort to improve the pre-college mathematics curriculum.

G. PRESENT COMMERCIAL AFFILIATIONS: The monograph series "New Mathematical Library" is published by Random House Inc., 457 Madison Ave., New York 22, N.Y. The filmed course for elementary school teachers is distributed by Modern Learning Aids, 3 East 54th St., New York 22, N.Y.

H. PURPOSES AND OBJECTIVES: The primary purpose of the SMSG is to foster research and development in the teaching of school mathematics. The work of SMSG consists primarily in the development of courses, teaching materials and teaching methods. It is a part of SMSG's task, in cooperation with other mathematical organizations, to encourage exploration of the hypotheses underlying mathematics education.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Normal classroom procedures.

J. ORIENTATIONS OF STATED OBJECTIVES: Understanding of and skill in mathematics.

K. LOCATION OF LIST OF OBJECTIVES: SMSG Bylaws; Newsletter No. 11.

L. SPECIFIC SUBJECTS, GRADE AND AGE LEVELS: Mathematics, kindergarten through grade 12; teacher training materials.

M. DESCRIPTION OF MATERIALS ALREADY PRODUCED:
Newsletters. Information concerning SMSG is disseminated through its Newsletters which appear at irregular intervals. Names are added to the mailing list for these Newsletters on request.
1. Organization, history and activities of SMSG.
2. Minnesota National Laboratory reports.

3. Teachers' reports on experimental units for grades 7 and 8.
4. Progress report on the work of SMSG.
5. In-service preparation of mathematics teachers.
6. Progress report on the work of SMSG and order form.
7. Publications available from Yale University Press.
8. Announcement of the New Mathematical Library Series.
9. Materials which should be ordered from SMSG.
10. Reports on student achievement in SMSG courses.
11. Future of SMSG, new projects and publications.
12. In-service education program and announcement of textbooks.
13. How texts are prepared and publications lists.
14. New Mathematical Library series in print and preparation.
15. Reports on various SMSG projects.
16. SMSG publications.
17. Lists Supplementary Publications and selected list of inexpensive books for supplementary use.
18. New SMSG publications.
19. Report of a survey of in-service programs for mathematics teachers.
20. SMSG publications.
21. Reference guide to the New Mathematical Library - Description, Topical classification and Index with suggested grade levels.
22. SMSG publications.
23. Panel on Supplementary Publications.
24. Reports of various SMSG projects.
25. Articulation of Content of SMSG Tests, grades 7-10.
25a. SMSG publications.
25b. Recent publications.
26. Mathematics for the Elementary School - Book K, Teacher's Commentary.
27. Book 1, Student's Text.
28. Book 1, Teacher's Commentary.
29. Book 2, Student's Text.
30. Book 2, Teacher's Commentary.
31. Book 3, Student's Text, Parts I and II.
32. Book 3, Teacher's Commentary, Parts I and II.
33. Grade 4, Student's Text, Parts I and II.
34. Grade 4, Teacher's Commentary, Parts I and II.
35. Grade 5, Student's Text, Parts I and II.
36. Grade 5, Teacher's Commentary, Parts I and II.
37. Grade 6, Student's Text, Parts I and II.
38. Grade 6, Teacher's Commentary, Parts I and II.
39. Mathematics for Junior High School - Volume I, Student's Text, Parts I and II.
40. Volume I, Teacher's Commentary, Parts I and II.
41. Volume II, Student's Text, Parts I and II.
42. Volume II, Teacher's Commentary, Parts I and II.
43. First Course in Algebra - Student's Text, Parts I and II.
44. Teacher's Commentary, Parts I and II.
45. Geometry - Student's Text, Parts I and II.
46. Teacher's Commentary, Parts I and II.
47. Geometry with Coordinates - Student's Text, Parts I and II.

48. Teacher's Commentary, Parts I and II.
49. Intermediate Mathematics - Student's Text, Parts I and II.
50. Teacher's Commentary, Parts I and II.
51. Elementary Functions - Student's Text.
52. Teacher's Commentary.
53. Introduction to Matrix Algebra - Student's Text.
54. Teacher's Commentary.
55. Introduction to Secondary School Mathematics - Volume I, Student's Text, Parts I and II.
56. Volume I, Teacher's Commentary.
57. Volume II, Student's Text, Parts I and II.
58. Volume II, Teacher's Commentary.
59. Introduction to Algebra - Student's Text, Parts I and II.
60. Teacher's Commentary, Parts I and II.
61. Analytic Geometry - Student's Textbook.
62. Teacher's Commentary.

Programmed Material.

63. Programmed First Course in Algebra (Form H) - Textbook, 2 parts, and Teacher's Commentary (one part).
64. Response Booklet.
65. Calculus - Textbook, Parts I and II.
66. Teacher's Commentary, Parts I and II.
67. Textbook, Part III.
68. Teacher's Commentary, Part III.
69. Algorithms, Computation and Mathematics - Student's Text.
70. Algorithms, Computation and Mathematics - Teacher's Commentary.
71. Fortran - Student's Text.
72. Fortran - Teacher's Commentary.
73. Algol - Student's Text.
74. Algol - Teacher's Commentary.
75. Book K - Teacher's Commentary, Special Edition.
76. Book 1, Parts I and II - Student's Text, Special Edition.
77. Book 1, Parts I and II - Teacher's Commentary, Special Edition.
77a. Developing Mathematics Readiness for Pre-school Programs.
78. SMSG: The Making of A Curriculum.
79. Mathematics Through Science - Part I, Student's Text.
80. Part I, Teacher's Commentary.
81. Part II, Student's Text.
82. Part II, Teacher's Commentary.
83. Part III, Student's Text.
84. Part III, Teacher's Commentary.
85. Mathematics and Living Things - Student's Textbook.
86. Teacher's Commentary.
87. Junior High School Mathematics Units, Number Systems, Student's Text.
88. Number Systems, Teacher's Commentary.
89. Geometry, Student's Text.
90. Geometry, Teacher's Commentary.
91. Applications, Student's Text.
92. Applications, Teacher's Commentary.

93. Junior High School Supplementary Unit, Text.
94. Junior High School Supplementary Unit, Commentary.
95. Essays on Number Theory, I.
96. Essays on Number Theory, II.
97. Development of the Real Number System.
98. Selected Units, Grade 4 (E-4150).
99. Probability for Primary Grades, Student Text.
100. Probability for Primary Grades, Teacher's Commentary.
101. Probability for Intermediate Grades, Student Text.
102. Probability for Intermediate Grades, Teacher's Commentary.
103. Introduction to Probability Part I - Basic Concepts, Student Text.
104. Introduction to Probability Part 2, Special Topics, Student's Text.

Supplementary and Enrichment Series.

105. Functions, Student's Text.
106. Circular Functions, Student's Text.
107. Functions, Circular Functions, Teacher's Commentary.
108. The Complex Number System, Student's Text.
109. The Complex Number System, Teacher's Commentary.
110. The System of Vectors, Student's Text.
111. The System of Vectors, Teacher's Commentary.
112. Non-Metric Geometry, Student's Text.
113. Non-Metric Geometry, Teacher's Commentary.
114. Plane Coordinate Geometry, Student's Text.
115. Plane Coordinate Geometry, Teacher's Commentary.
116. Inequalities, Student's Text.
117. Inequalities, Teacher's Commentary.
118. Numeration, Student's Text.
119. Numeration, Teacher's Commentary.
120. Algebraic Structures, Text and Answers.
121. Factors and Primes, Student's Text.
122. Factors and Primes, Teacher's Commentary.
123. Mathematical Systems, Student's Text.
124. Mathematical Systems, Teacher's Commentary.
125. Systems of First Degree Equations in Three Variables, Student's Text.
126. Systems of First Degree Equations in Three Variables, Teacher's Commentary.
127. Radioactive Decay.
128. Absolute Value, Student's Text.
129. Absolute Value, Teacher's Commentary.
130. Mathematical Theory of the Struggle for Life.
131. 1 + 1 = ?.

Reprint Series.

132. The Structure of Algebra.
133. Prime Numbers and Perfect Numbers.
134. What is Contemporary Mathematics.
134a. Mascheroni Constructions.
134b. Space, Intuition and Geometry.
134c. Nature and History of π.
134d. Computation of π.

134e. Mathematics and Music.
134f. The Golden Measure.
134g. Geometric Constructions.

Studies in Mathematics.

135. Euclidean Geometry Based on Ruler and Protractor Axioms.
136. Structure of Elementary Algebra.
137. Geometry.
138. Concepts of Informal Geometry.
139. Number Systems.
140. Intuitive Geometry.
141. Concepts of Algebra.
142. Brief Course in Math for Elementary School Teachers.
143. Applied Mathematics in the High School.
144. Mathematical Methods in Science.
145. A Brief Course in Mathematics for Junior High School Teachers.
146. In-service Course for Primary School Teachers.
147. Introduction to Number Systems.
147a. Calculus and Science.
147b. Some Uses of Mathematics.
147c. Mathematical Concepts of Elementary Measurement.

Conference Reports.

148. Elementary School Mathematics.
149. Orientation Conference for SMSG Experimental Centers.
150. Orientation Conference for SMSG Elementary School Experimental Centers.
151. Orientation Conference for Geometry with Coordinates.
152. Future Responsibilities for School Mathematics.
153. Mathematics Education for Below Average Achievers.

Study Guides in Mathematics.

154. Study Guides in Mathematics (Volume includes Algebra, Calculus, Digital Computing and related mathematics, Geometry, Intermediate Mathematics, Number Theory, Probability and Statistics).
155. Very Short Course in Math for Parents.
156. Philosophies and Procedures of SMSG Writing Teams.

Spanish.

157. Mathematicas Para El Primer Ciclo Secundario, Text - 2 Parts, Volumen I.
158. Mathematicas Para El Primer Ciclo Secundario, Comentario - 2 Parts, Volumne I.
159. Mathematicas Para El Primer Ciclo Secundario, Text - 2 Parts, Volumen II.
160. Mathematicas Para El Primer Ciclo Secundario, Comentario - 2 Parts, Volumen II.
161. Mathematica Para La Escuela Secundaria, Primer Curso de Algebra, Text - 2 Parts.
162. Mathematica Para La Escuela Secundaria, Primer Curso de Algebra, Comentario - 2 Parts.
163. Mathematica Para La Escuela Secundaria, Geometria, Text - 2 Parts.
164. Mathematica Para La Escuela Secundaria, Geometria, Comen-

tario - 2 Parts.
165. Mathematicas Para La Escuela Secundaria - Mathematica Intermedia, 2 Parts.
166. Mathematicas Para La Escuela Secundaria, Funciones Elementales.
167. Mathematicas Para La Escuela Secundaria, Introduccion Al Algebra De La Matrices.
167a. Matematicas Para La Escuela Primaria, Grado 4, 2 Parts, Comentario.
168. Mathematicas Para La Escuela Primaria, Grado 5, 2 Parts, Comentario.
169. Mathematicas Para La Escuela Primaria, Grado 6, 2 Parts, Comentario.
169a. Estudios De Matematicas, Conceptos de Geometria Intuitiva.
170. El Curso Conciso En Mathematicas Para Los Profesores De Escuela Primaria.
170a. Introduccion A Sistemas Numericos.

Films. A series of 30 half-hour films constitute an in-service course for elementary school teachers. No. 142 above is the text for this course. These films are distributed by Modern Learning Aids, 3 East 54th Street, New York, N.Y. 10022.

New Mathematical Library.

171. Numbers: Rational and Irrational by I. Niven.
172. What is Calculus About? by W.W. Sawyer.
173. An Introduction to Inequalities by E. Beckenbach and R. Bellman.
174. Geometric Inequalities by N.D. Kazarinoff.
175. The Contest Problem Book I, Annual High School Contests of the MAA, 1950-1960 compiled and with solutions by C.T. Salkind.
176. The Lore of Large Numbers by P.J. Davis.
177. Uses of Infinity by L. Zippin.
178. Geometric Transformations by I.M. Yaglom, translated from the Russian by A. Shields.
179. Continued Fractions by C.D. Olds.
180. Graphs and Their Uses by O. Ore.
181. Hungarian Problem Book I, Eotvos Competitions 1894-1905 translated from Hungarian by Elvira Rapaport.
182. Hungarian Problem Book II, Eotvos Competitions 1906-1928 translated from Hungarian by Elvira Rapaport.
183. Episodes from the Early History of Mathematics by A. Aaboe.
184 Groups and Their Graphs by I. Grossman and W. Magnus.
185. Mathematics of Choice - How to Count Without Counting by I. Niven.
186. From Pythagoras to Einstein by K.O. Friedrichs.
187. The MAA Problem Book II, Annual High School Contests of the MAA, 1961-1965 compiled and with solutions by C.T. Salkind.
188. First Concepts of Topology by W.G. Chinn and N.E. Steenrod.
189. Geometry Revisited by H.S.M. Coxeter and S.L. Greitzer.

N. MATERIALS AVAILABLE FREE: Newsletters Nos. 10, 14, 15, 17, 19, 21, 22, 23, 24, and 25; Report No. 1 - The Programmed Learning Project; Report No. 2 - The Special Curriculum Project: Pilot Pro-

gram on Mathematics Learning of Culturally Disadvantaged Primary School Children; Report No. 3 - A Film-Film Text Study; Report No. 4 - The Special Curriculum Project: 1965-66; Report No. 5 - The Slow Learner Project: The Secondary School "Slow Learner" in Mathematics. Available on request from SMSG headquarters.

O. MATERIALS PURCHASABLE: Prices subject to change. See Newsletter No. 26, April 1967.

For New Mathematical Library series, a special school edition is available to students and teachers from the L.W. Singer Co., Inc., 501 Madison Ave., New York, N.Y. 10022, for 99¢ per copy.

A paperbound trade edition is available from Random House, Inc., 457 Madison Ave., New York, N.Y. 10022, at $1.95 per copy, and a hard cover edition priced at $2.95 may be ordered from the Random House School and Library Services, Inc. at the same address.

P. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

Q. LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: Spanish, Swedish, Turkish, Chinese, and Portuguese.

R. PROJECT IMPLEMENTATION: (Not answered).

S. PROJECT EVALUATION: (Not answered).

T. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: Initial classroom try out of new junior high school sequence.

U. PLANS FOR THE FUTURE: (Not answered).

A. PROJECT TITLE: SCIENCE COURSES FOR BACCALAUREATE EDUCATION: INTRODUCTION TO NATURAL SCIENCE.

B. PROJECT DIRECTOR: Dr. V. Lawrence Parsegian, Rensselaer Professor, Rensselaer Polytechnic Institute, Troy, New York 12181.

C. PROJECT HEADQUARTERS:
1. Contact: For questions on the course itself: Dr. V. L. Parsegian, Science Courses for Baccalaureate Education: Introduction to Natural Science, Rensselaer Professor, Rensselaer Polytechnic Institute, North Hall, Room 102, Troy, New York 12181. For information on textbooks: Academic Press, Natural Science Program, 111 Fifth Avenue, New York, New York 10003. For information on lecture aids: Raytheon Education Co., Natural Science Program, 285 Columbus Avenue, Boston, Massachusetts 02116.
2. Special facilities or activities available for visitor viewing: Brochures and reprints from Academic Press, progress reports.

D. PRINCIPAL PROFESSIONAL STAFF: There are too many faculty participants to list.

E. PROJECT SUPPORT: Charles F. Kettering Foundation of Dayton, Ohio.

F. PROJECT HISTORY:
1. Principal originators: Dr. V.L. Parsegian, Chairman of Advisory Committee consisting of Dr.'s David G. Barry, Walter H. Bauer, Loren Eiseley, Harry W. Jones, Adolph Lowe, Henry Margenau, Ronald A.H. Mueller, and Ernest Nagel.
2. Date and place of initiation: September 1964; Rensselaer Polytechnic Institute, Troy, New York.
3. Reason for initiation: (Not answered).

G. PRESENT COMMERCIAL AFFILIATIONS: Academic Press for publication of textbooks and Teacher's Guide; Raytheon Education Company for lecture aids, apparatus.

H. PURPOSES AND OBJECTIVES: The project was addressed to the development of a multidisciplinary, integrated course in science suitable for all college students, emphasizing modern physical and life sciences but giving attention to historical features and trends in the sciences, their philosophical and social implications.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Programmed instruction; laboratory investigations; lectures; discussion groups.

J. ORIENTATIONS OF STATED OBJECTIVES: Attitudinal changes; scientific literacy.

K. LOCATION OF LIST OF OBJECTIVES: Brochures available from Academic Press.

L. SPECIFIC SUBJECTS, GRADE AND AGE LEVELS: Physical and Life Sciences, freshmen and sophomores of baccalaureate and junior colleges. (Also being used for advanced classes in high schools).

M. DESCRIPTION OF MATERIALS ALREADY PRODUCED:
1. Volume I - The Physical Sciences, published July 15, 1968.
2. Laboratory and Mathematics Supplement, published July 15, 1968.
3. Teacher's Guide, published July 15, 1968.
4. Volume II - The Life Sciences (individual copies available September 1968 in mimeographed form; in published form July 1969).

N. MATERIALS AVAILABLE FREE: Brochures and reprints available from Academic Press, Inc., Natural Science Program, 111 Fifth Avenue, New York, New York 10003. Teacher's Guide for purchasers of textbooks.

O. MATERIALS PURCHASABLE: Volume I and Laboratory and Mathematics Supplement. Transparencies for lecture use available from Raytheon Education Co.

P. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

Q. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: (Not answered).

R. PROJECT IMPLEMENTATION:
1. Number of teachers using materials: Pilot classes in five colleges currently.
2. Number of students involved: Currently about 300.
3. Number of schools involved: 5.
4. Sources of totals in 1, 2, and 3 above: (Not answered).
5. Name and location of specific schools where course is being taught: Rensselaer Polytechnic Institute, Russell Sage, Troy, New York; Finch College, New York, New York; State University of New York at Plattsburgh, Plattsburgh, New York; Nathaniel Hawthorne College at Antrim, New Hampshire.
6. Availability of consultants for teachers: Dr. V.L. Parsegian and associates.
7. Activities conducted for in-service teacher training: By special arrangement.
8. Implementation procedures in addition to above: The Teacher's Guide offers detailed lecture procedures. Also the transparencies for use with overhead projector.
9. Implementation procedure, seemingly, the most effective: The Teacher's Guide and transparencies.
10. How evaluated: Only through the personal experiences of the teachers (approximately 12) who have participated in giving lectures.

S. PROJECT EVALUATION:
1. Evaluation conducted by: (Not answered).
2. Instruments used: (Not answered).
3. Control groups: (Not answered).
4. Feedback process: The staff has made extensive use of questionnaires, student "feedback committees," etc.
5. Research evidence of objectives achieved: Only the reactions of the students in the pilot classes, including a wide range of student background, interest, capability.
6. Availability of evidence: Not available in organized form.

The staff invites visits with teachers of pilot classes.

T. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: Commercial ties have been established to produce text and other materials. Text materials made ready for publication.

U. PLANS FOR THE FUTURE: (Not answered).

A. PROJECT TITLE: SCIENCE CURRICULUM IMPROVEMENT STUDY (SCIS).

B. PROJECT DIRECTOR: Robert Karplus.

C. PROJECT HEADQUARTERS:

1. Contact: General inquiries or requests for free materials should be sent to the Newsletter editor; specific problems or questions regarding the project to Herbert Thier, Assistant Director.

2. Address: Science Curriculum Improvement Study, Lawrence Hall of Science, University of California, Berkeley, California 94720.

3. Special facilities or activities available for visitor viewing: The project will make arrangements for visitors to see its operations, talk with staff members, and attend classes where SCIS materials are being trial taught.

D. PRINCIPAL PROFESSIONAL STAFF: Robert Karplus, Director; Herbert D. Thier, Assistant Director; Chester A. Lawson, Director of Life Sciences; Luke E. Steiner, Physicist; Carl Berger, Physicist; Joan Coffman, Teacher; David Conard, Biologist; Joseph Davis, Chemist; James Eakin, Schools Coordinator; Jack Fishleder, Implementation Program Leader; Sandra Fletcher, Biologist; Robert Knott, Biologist; Paul Lindquist, Teacher; Laurence Malone, Biologist; Barbara Mayer, Physicist; Esther McLaughlin, Biologist; Marshall Montgomery, Physicist; George Moynihan, Project Coordinator; Patricia Ness, Psychologist; John Quick, Film Director; Audrey Richards, Biologist; Ellen Siegelman, Psychologist; Olympia Tresmontan, Teacher Education Specialist; Hugh Young, Physicist; David Youngdahl, Art Director. Trial Center Coordinators: Les Allen, Acting Coordinator, University of Hawaii, Honolulu, Hawaii; Glenn Berkheimer, Michigan State University, East Lansing, Michigan; Stanford Davis, University of California, Los Angeles, California; John Renner, University of Oklahoma, Norman, Oklahoma; Mary Budd Rowe, Teachers College, Columbia University, New York. Director of Teacher Education: Willard Jacobson, Teachers College, Columbia University, New York.

E. PROJECT SUPPORT:

1. Organizational sponsorship: University of California, Berkeley.

2. Funding agency: National Science Foundation.

F. PROJECT HISTORY: The Science Curriculum Improvement Study was established in the winter of 1962 by Robert Karplus, a professor of theoretical physics at the University of California, Berkeley, as a result of his work with the Elementary School Science Project at that university. This experience had led Professor Karplus to the conclusion that science had not only to be simplified for the elementary school, but organized on a drastically different basis from the usual logical subject-matter presentations to which the university scientist is accustomed.

G. PRESENT COMMERCIAL AFFILIATIONS: Raytheon Education Company--preliminary publication program.

H. PURPOSES AND SPECIFIC OBJECTIVES: SCIS usually capsulizes its purposes as the development of scientific literacy. But it is important to delineate exactly what is meant by that term, and how the staff hopes to achieve this goal. An important meaning of scientific literacy is a sufficient knowledge and understanding of the fundamental concepts of both the biological and physical sciences for effective participation in twentieth century life. The role science plays in society is continually increasing in importance and will not be decided by the scientist alone. To join in making wise decisions, the non-scientist will have to have an understanding of the real nature of science. A second implication of scientific literacy is the development of a free and inquisitive attitude and the use of rational procedures for decision-making. In the SCIS program, children learn science in an intellectually free atmosphere where their own ideas are respected, where they learn to test their ideas by experiment, and where they learn to accept or reject ideas, not on the basis of some authority, but on the basis of their own observations. Ideally, some of these experiences will carry over to other areas of life and incline the children to make decisions on a more rational basis after weighing the factors or evidence involved more objectively.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: How does SCIS go about achieving these goals? SCIS uses a materials-centered approach in which the elementary classroom actually becomes a laboratory. In their first explorations of a new concept, the children are allowed to manipulate or observe selected materials, sometimes freely in any way they wish and sometimes under the guidance of the teacher. As a result of these preliminary explorations, the children have a new experience--direct physical contact with natural phenomena. As the next step, the teacher introduces the scientific concept that describes or explains what the children have observed. This is called the "invention" lesson. Following the invention lesson, other experiences are provided that present further examples of the concept. These are called "discovery" lessons. Through this procedure, the child is expected to recognize that the new concept has applications to situations other than the initial example. In other words, the discovery experiences reinforce, refine and enlarge upon the concept.

J. ORIENTATIONS OF STATED OBJECTIVES: As stated in Section H above, the objectives of SCIS are oriented toward scientific literacy.

K. LOCATION OF LIST OF OBJECTIVES: Specific objectives for each unit may be found in the introduction to each part of a unit.

L. SPECIFIC SUBJECTS, GRADE AND AGE LEVELS: Sequential physical and life science curriculum suggested for grades K-6.

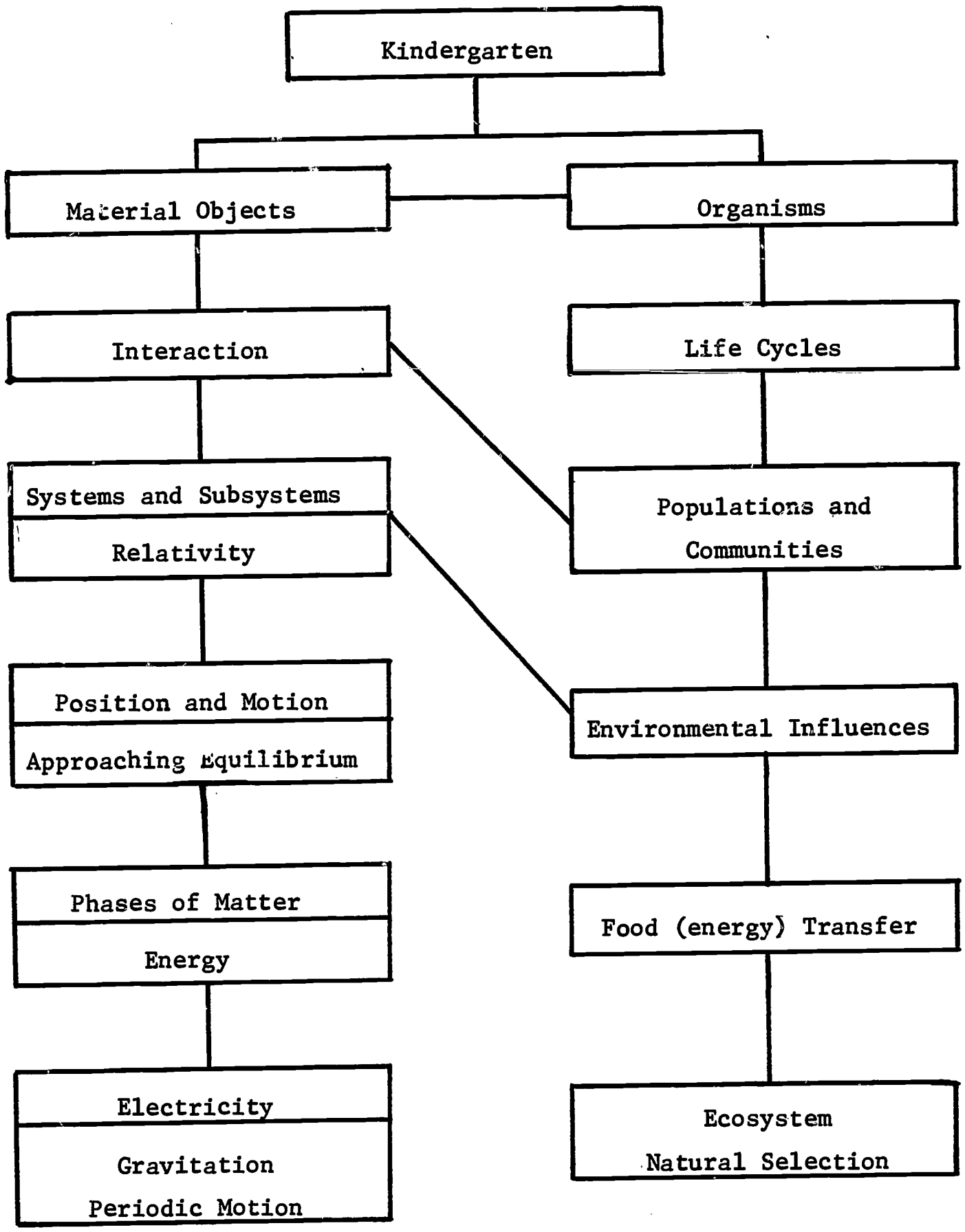
M. DESCRIPTION OF MATERIALS ALREADY PRODUCED:

1. Material Objects. The main objective of this unit is to teach the child to recognize material objects in his environment and to distinguish their properties. Through their investigations, it is also hoped that the children will develop careful habits of observation, the ability to discriminate fine differences and recognize broad similarities, as well as build a vocabulary useful in describing objects. The unit begins by introducing the child to the concepts of objects and properties. After this introductory work, the concept of material is invented and the children experiment through the comparison and sorting of similarly shaped pieces of aluminum, brass, pine, walnut and polystyrene. The children then compare objects with respect to one property that exhibits quantitative variation and practice serial ordering. This introduces a semi-quantitative aspect to the child's comparison of objects. The last section of the unit emphasizes the children's acting upon objects. They experiment with various materials (ice, lump sugar, rock candy) in order to change their form while retaining their identity. An understanding of the concepts presented in this unit is vital to later exploration in all the physical and life science units.

2. Organisms. Just as the goal of the biologist is to understand life, so the goal of the SCIS Life Science Program is to provide children with classroom and field experiences that will lead to a better understanding of life. For that reason, the SCIS Life Science Program has been built around the concept of the ecosystem. In Organisms, a model of an ecosystem is presented in the form of an aquarium which serves as a focus for the classroom investigations of animals and plants living in a real environment. In addition to observing aquaria, the children plant various common garden seeds and observe germination and growth of plants.

3. Interaction. The Interaction unit is intended to follow Material Objects. It consists of a review section followed by five major parts on systems, invention and discovery of interaction, chemical interaction, interaction-at-a-distance, and electric circuits. A "system" refers to a group of objects that is mentally separated from everything else so that the relations of these objects may receive special attention. The systems concept is introduced to primary grade children who are going through the process of developing conservation logic to help them generalize their reasoning from the transformations they have mastered to those they have not yet understood. This concept also enables children to name and thereby discuss experimental setups and other entities that have no common name. Further, the selection of systems helps children to focus their attention and organize the information received through their senses. The "interaction" concept is being used more and more widely to explain social and scientific phenomena. The idea that changes result from an interaction is demonstrated with several simple experiments.

SUBJECT AREAS OF THE SCIS PROGRAM (1967)



Interaction-at-a-distance examples show that physical contact between interacting objects is not always necessary. The unit also contains opportunities to investigate examples of thermal, magnetic, and electric interactions. The interaction concept helps children see the relationship among objects that are involved in a phenomenon and makes it easier for them to leave behind the earlier stages in which they appeal to mere descriptions, final outcomes, mysterious agents, or innate powers to explain events.

4. Life Cycles. The major theme of the second year life science program is the nature of life. What properties or processes are common to all living things? How does one distinguish between the living and the nonliving? The staff has limited the children's exploration of life in this unit to some general ideas that they can understand on the basis of what they observe. Each experience with a living organism should increase the child's awareness of the difference between living and nonliving objects. At the same time, he should develop some understanding of a few fundamental concepts of biology. The concepts are: reproduction, growth, germination, metamorphosis, life cycle, generation and biotic potential.

5. Systems and Subsystems. This unit expands the systems concept from the Interaction unit to include the important interrelated parts within a given system. The systems and subsystems concepts are applied during many investigations in this unit. The children's explorations begin with common objects, such as a magnet and compass, vinegar and washing soda, medicine dropper and syringes and sand and screens. They continue to define less familiar systems and subsystems as they work with electric circuits, liquid solutions, crystals, liquid and gaseous Freon, and an SCIS invention: the rotating Whirly Bird.

6. Relativity. The qualitative work the children carry out in the Relativity unit enables them to understand better the full meaning of the theory of relativity at a later time. To help the children consider problems of position and motion, SCIS has created an artificial observer called Mr. O, who always describes the location of objects relative to himself. This exercises the children's ability to leave their own reference frame and think of their environment from other points of view.

7. Position and Motion. The reference frame concept invented in the Relativity unit is the central theme of Position and Motion. Two types of reference systems are introduced: a ruler-protractor system for determining polar coordinates, and a plastic overlay for describing rectangular coordinates. The children discover from early explorations in the unit, that to describe accurately a position, a starting point and a reference direction must be determined. In addition, two measurements must be found: either the degree of angle from the reference direction and the distance in the case of polar coordinates, or two distances, in the case of rectangular coordinates. The

children gain practice in using these systems as they guide characters in a story on a trip through Yellowstone Park and later to various points on the map of a small town. After the children become familiar with describing position, the concept of motion is introduced. This makes it possible for them to consider several positions of a single object.

N. MATERIALS AVAILABLE FREE: Newsletter (subscription free upon request); Chester A. Lawson, So Little Done, So Much to Do: An explanation for the layman of the rationale behind innovation in science curriculum; Robert Karplus and Herbert D. Thier, Toward Scientific Literacy. Reprinted from Education Age, Volume 2, Number 2, January-February 1966; Chester A. Lawson, "The Life Science Program of the Science Curriculum Improvement Study," reprinted from The American Biology Teacher, Vol. 29, No. 3, March 1967. Other miscellaneous reprints.

O. MATERIALS PURCHASABLE: Individual teacher's guides are available from SCIS Headquarters at the following prices: Nos. 1 and 4, $1.00 each; Nos. 2 and 6, $3.00 each; Nos. 3, 5, and 7, $1.50 each. From Raytheon Education Company, 285 Columbus Avenue, Boston, Mass. 02116, preliminary version of manuals and equipment kits are presently available for Nos. 1, 2 and 3. No. 5 to be available in May 1968; No. 6 to be available in July 1968.

Films showing actual classroom situations for the units Material Objects and Interaction are available for rent from the Extension Media Center, 2223 Fulton Street, Berkeley, Calif. 94720. The cost of rental is $4.00 each for the first day, $2.00 for each additional day. The films showing Material Objects activities are "Material Objects Overview," "Observing Liquids," and "Experimenting with Air." Interaction films are "Interaction Overview" and "Interaction Documentary."

P. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

Q. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: None.

R. PROJECT IMPLEMENTATION: Based on the sale of approximately 600 kits (equipped for 32 children), the staff estimates that over 19,000 children are presently studying SCIS units in schools throughout the country. Of these 600 teachers, approximately 450 are associated with the schools in the six trial centers listed below:

Berkeley Area Trial Schools: Berkwood, LeConte, Longfellow, Washington and Emerson in Berkeley; Glorietta School in Orinda. Oklahoma Trial Center: The Laboratory School of the University of Oklahoma in Norman; Adams, Cleveland, Jackson, Lincoln, McKinley, Monroe, Washington and Wilson Schools in Norman; John Tyler and Rollingwood Schools in Oklahoma City. New York Trial Center: Agnes Russell Schools, P.S. 125 and P.S. 145 in New York City; Quarles, Cleveland and Lincoln Schools in Englewood, N.J.; Walter Stillman and Ralph Maughaum

Schools in Tenafly, N.J. Hawaii Trial Center: Laboratory School of the University of Hawaii, Honolulu, Aliiolani, Kashumanu, Kahala, Manoa, Noelani, Maryknoll, and Hongwanji Mission Schools in Honolulu. Los Angeles Trial Center: University Elementary School of UCLA; Burnside and Overland Schools, Los Angeles; Hudnall School, Inglewood; Hesby and Sherman Oaks Schools, Van Nuys. Michigan Trial Center: L.J. Griswold Elementary in Dewitt; Delta Center Elementary School in Lansing; Perry Elementary School in Perry.

New approaches to teacher education are developed and tested in the SCIS Trial Centers. The Trial Center Coordinators, Leslie Allen of the University of Hawaii, Honolulu; John Renner of the University of Oklahoma; Stanford Davis of the University of California at Los Angeles; Mary Budd Rowe of Teachers College, Columbia University; and Glenn Berkheimer of Michigan State University, each develop approaches to in-service education. These in-service programs are designed to help the elementary school teachers in the trial centers use the SCIS elementary science program more effectively. From these experiences in teacher education in the trial centers, the staff hopes to develop teacher education materials and procedures that can be used in other teacher education programs.

A variety of procedures and methods are tried in the in-service programs in the trial centers. A sourcebook is being developed which will contain original papers on the theoretical, historical and psychological foundations of the SCIS program. A number of original papers providing background information in areas of science and education closely related to the SCIS elementary science program are being prepared.

Teachers have had opportunities to use SCIS materials with small groups of children, and some of these experiences have been videotaped so that teachers can analyze their own work. Slides, filmstrips, transparencies and other audio-visual materials are also planned.

The materials and procedures used in the SCIS Teacher Education Program are being evaluated in the trial centers. Both teachers and coordinators submit their reactions and make suggestions for additional materials, new teaching procedures and different kinds of consultant help.

The procedures for developing and perfecting the SCIS Teacher Education Program are similar to those being used in developing the elementary science program. Procedures and materials are proposed, subjected to criticism, and tried out in exploratory teaching. The materials and procedures then undergo more extensive testing in the trial centers. Eventually, it is hoped that a tested teacher education program with a variety of suggested procedures and effective materials will be available for use by teaching education institutions and school systems interested in the SCIS program.

The SCIS Teacher Education Program is under the direction of Dr. Willard Jacobson, Teachers College, Columbia University.

In addition to the implementation of SCIS materials

through the trial centers, SCIS began an Implementation Program in the fall of 1967. During the school year, university science educators, school district science supervisors, and other key people in education visit the project for from one to two weeks and become familiar with the philosophy, methods and materials of the Science Curriculum Improvement Study. After completion of his study-visit, the science educator will be able to act as consultant to various communities as they plan and set up new science programs. As of the winter of 1968, over 20 science educators had participated in this individualized, leadership program.

S. PROJECT EVALUATION: The overall purpose of the evaluation program is to provide teachers and curriculum organizers with information regarding possible adoption and choice of strategies for teaching the program once adopted.

The kind of feedback loop the staff is primarily concerned with includes the teacher and the pupils in the class. The teacher must be sensitive to the behavior of the students and to the behavior of the phenomena and must be prepared to change the classroom strategy in the light of this information. The teacher, too, must have diagnostic devices--some even operating on the intuitive level--that identify both sources of difficulty and opportunities for achieving insight. This feedback loop must be permanently built into the curriculum and into the teachers.

The construction of valid, reliable and especially practical procedures that can be used routinely by the teacher for assessing student progress and that provide adequate data for studying the interaction of instructional and student variables will be of central concern in the evaluation program. In addition, the developmental nature of the SCIS curriculum creates an opportunity to study the cumulative impact of the proposed program on the students, on the teachers, and on the total learning situation provided for students.

With these aims for feedback, comparisons between students who have had the experimental program and those who have not are of minimal importance. It is, however, important to make comparisons regarding the achievement level of various groups of students within the program. Since all groups of students in the program are unlikely to achieve the goals and objectives of the program in the same way or to the same degree, information is needed to begin to understand the complex of variables that is associated with differences in achievement of groups of students. This kind of information is of value in improving the teaching-learning situation.

T. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: Since the publication of Material Objects in 1966, two more units have been published in preliminary editions: Interaction, the second-level physical science unit was published in the fall of 1967, and Organisms, a first level life science unit, became available in January 1968. Systems and Subsystems, a third

level physical science unit, is expected to be in preliminary edition in May of 1968, followed by the preliminary edition of Relativity in the summer of this year. In addition, several new units have been developed and are undergoing trial teaching in the Berkeley Schools.

U. PLANS FOR THE FUTURE:

1. Physical Science Program: Plans for the physical science program have been completed through the upper elementary grades. Some of these units are presently being taught in trial version in the Berkeley area schools, and some are undergoing exploratory teaching. To be taught along with Position and Motion, another fourth year unit has been planned which will investigate phenomena approaching equilibrium. The children will experiment with pendula and other moving objects seeking equilibrium, as well as examples of materials approaching thermal equilibrium. The emphasis in this unit shifts to quantitative approaches and recordkeeping which form an important aspect of the upper grade units. In the fifth year, the children work with two units exploring more advanced aspects of physical science: Phases of Matter, which deals with the interesting, sometimes dramatic, changes of phase (from solid to liquid to gas) inherent in all matter; and Energy, which presents the energy concept in terms of energy transfer as the children experiment with combustion, ice-melting experiments and the thermal conductivity of various materials. The final year of the physical science program introduces the children to concepts of electricity and magnetism, concepts which were briefly presented as early as the Interaction unit. With increased ability to hypothesize and deal with abstractions, the children are able to explore these concepts in greater depth. Another unit, on gravitation and periodic motion, investigates the motion of falling objects through the air and down inclined planes. From these experiences, the concept of gravitational field is invented and used to explain periodic motion.

2. Life Science Program. Investigation of the ecosystem will continue through the sixth year with the program each year building on the experiences of the previous unit. During the third year the children again focus on aquaria, but this time their attention is drawn to populations rather than to individuals. Populations of different plants and animals living together in specific geographic areas in a balanced state called a community. The food chain or food web where organisms eat or are eaten forms the basic relation among populations in a community. Reproduction within each population maintains it and at the same time produces food for some other populations. The correct balance between reproduction and feeding maintains the community. Through observing the changes that take place in their aquarium and terrarium communities, the children will gain an understanding of predator-prey relations and food webs.

During the fourth year, adaptations of organisms becomes the central theme. The main objective of this unit is to have the children recognize that environments are variable; that

organisms are sensitive to their environment in a number of ways; that this sensitivity enables the organisms to change to fit the changing environment.

The fifth and sixth year programs are not fixed. During the past year a unit was developed on the subject of natural selection. It presents the children with some ideas about the evolutionary changes that lead to adaptation of organisms. In addition to natural selection, development was begun on the subject of plants in relation to their function as primary food producers in a community, of food transfer through the various animal populations in a community, of decomposition of the excreta of organisms and of dead plants and animals to produce the material in the soil that plants use as nutrients. This investigation introduces the pupils to the microscopic world of bacteria and fungi that obtain their food by decomposing organic material and change it into a form that is usable by green plants. A possible terminal unit of the life science program would be an introduction to the natural ecosystem in which the children live. This might involve a study of local weather and climate, of the organisms living in the habitats of the area, and perhaps the effect man has had on the local ecosystem.

A. PROJECT TITLE: SECONDARY SCHOOL MATHEMATICS CURRICULUM IMPROVEMENT STUDY (SSMCIS).

B. PROJECT DIRECTOR: Professor Howard F. Fehr, Box 120, Teachers College, Columbia University, New York, N.Y. 10027. Tel. 212-870-4826.

C. PROJECT HEADQUARTERS:
1. Contact: Professor Fehr, SSMCIS.
2. Special facilities or activities available for visitor viewing: None.

D. PRINCIPAL PROFESSIONAL STAFF: Chief Consultants: Marshall Stone, University of Chicago; Albert Tucker, Princeton University; Julius Hlavaty, NCTM; Meyer Jordan, Brooklyn College; Vincent Haag, Franklin and Marshall College; Edgar Lorch, Columbia University; Hans-Georg Steiner, U. of Karlsruhe, Germany.

E. PROJECT SUPPORT:
1. Organizational sponsorship: Teachers College, Columbia University.
2. Funding agency: U.S. Office of Education.

F. PROJECT HISTORY:
1. Principal originator: Howard F. Fehr.
2. Date and place of initiation: Setpember 1965; Teachers College, Columbia University.
3. Reason for initiation: To construct unified school mathematics curriculum (7-12).

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PURPOSES AND OBJECTIVES: The Secondary School Mathematics Curriculum Improvement Study (SSMCIS) has two main objectives: (1) To formulate and test a unified secondary school mathematics program (7-12) that will take capable students well into current collegiate mathematics; (2) to determine the education required by teachers who will implement such a program.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: No special instructional techniques are employed.

J. ORIENTATIONS OF STATED OBJECTIVES: Content mastery; process acquisition.

K. LOCATION OF LIST OF OBJECTIVES: In the various progress and final reports.

L. SPECIFIC SUBJECTS, GRADE AND AGE LEVELS: Secondary school mathematics--courses for grades seven and eight have been developed so far.

M. DESCRIPTION OF MATERIALS ALREADY PRODUCED:
1. Unified Modern Mathematics, Course I, Parts 1 and 2.
2. Unified Modern Mathematics, Course II, Parts 1 and 2.
These are textbooks for use in grades seven and eight respectively.

N. MATERIALS AVAILABLE FREE: A variety of progress reports that have been published from time to time by the project.

O. MATERIALS PURCHASABLE: Each of the experimental textbooks may be purchased at a cost of $2.00 per book or $8.00 for a full set. Checks should be made payable to Teachers College and mailed to SSMCIS, Box 120, Teachers College, Columbia University, New York, N.Y. 10027.

P. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

Q. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: None.

R. PROJECT IMPLEMENTATION:

1. Number of teachers using materials: 25.
2. Number of students involved: 1,000.
3. Number of schools involved: 11.
4. Sources of totals in 1, 2, and 3 above: Schools in the New York area that expressed an interest in participating in the experiment. Schools were chosen close to New York so that close cooperation would be easier.
5. Name and location of specific schools where course is being taught: The following is a partial listing: Hunter College High School, New York, N.Y.; Ridge Street School, Portchester, N.Y.; Stanforth Junior High School, Elmont, N.Y.; Thomas Jefferson Junior High School, Teaneck, N.J.; Germantown Academy, Fort Washington, Pa.; Leonia High School, Leonia, N.J.; Bedford Junior High School, Westport, Conn.; University School, Southern Illinois University, Carbondale, Ill.
6. Availability of consultants for teachers: Available. Project staff members make regular visits to pilot classes and are available at any time to answer questions that teachers might have. Periodic meetings are held at the college.
7. Activities conducted for in-service teacher training: A six-week summer class for preparing teachers to teach the new materials and periodic all day meetings to answer specific teaching problems.

S. PROJECT EVALUATION:

1. Evaluation conducted by: Project staff.
2. Instruments used: Specially designed student tests and the standardized STEP mathematics test.
3. Control groups: None used.
4. Feedback process: Regular visitation of the pilot classes by project staff members, periodic all day meetings with the teachers, analysis of the test results which is then sent to the teachers.
5. Research evidence of objectives achieved: Achievement scores on the tests mentioned in S2.
6. Availability of evidence: Not available.

T. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: (Not answered).

U. PLANS FOR THE FUTURE: A syllabus conference in June 1968 will

outline revisions desired in the present courses and plan a new course for the ninth grade. During summer of 1968 a team of writers will produce a ninth grade textbook. Then, during the 1968-1969 school year, all materials will again be taught in pilot classes.

A. PROJECT TITLE: SECONDARY SCHOOL SCIENCE PROJECT (SSSP).

B. PROJECT DIRECTOR: Dr. George J. Pallrand, 10 Seminary Place, Rutgers-The State University, New Brunswick, New Jersey 08903.

C. PROJECT HEADQUARTERS:
1. Contact: Mrs. Helen Markham, SSSP.
2. Special facilities or activities available for visitor viewing: Examination of materials; classes, by special arrangement; discussion with staff members.

D. PRINCIPAL PROFESSIONAL STAFF: George J. Pallrand, Director; Michael D. Piburn, Assistant Director; Lois B. Arnold, Publications Director; Evelyn Wilson, Professional Associate; James F. Murphy, Administrator; Helen M. Markham, Professional Assistant; Sheldon Judson, Consultant; H.D. Holland, Consultant.

E. PROJECT SUPPORT:
1. Organizational sponsorship: Rutgers-The State University.
2. Funding agency: National Science Foundation.

F. PROJECT HISTORY:
1. Principal originators: Frederick L. Ferris, Jr.; George J. Pallrand.
2. Date and place of initiation: April 1963; Princeton University, Princeton, New Jersey.
3. Reason for initiation: Need for curriculum reform in science at this level.

G. PRESENT COMMERCIAL AFFILIATIONS: Webster Division, McGraw-Hill Book Company.

H. PURPOSES AND OBJECTIVES: Curriculum development: The Project is currently involved in completing work on the interdisciplinary, physical science course Time, Space, and Matter (T.S.M.). The course is divided into nine sequential Investigations, each of which is accompanied by a student book providing a source of observations and data not obtainable in the laboratory. Course content, objectives and procedures are contained in the Teacher Folios which also accompany the Investigations. There is no text--students keep a record of their progress in the course in a notebook--but specially selected readings are provided. Laboratory work is an integral part of Time, Space, and Matter and equipment and supplies for that work also come in the course "package." Evaluation: See section S of this report. Teacher Training: The Project is actively involved in the training of teachers and resource people. Various media, especially video tapes, are being explored for this purpose.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study; laboratory investigations; discussion groups.

J. ORIENTATIONS OF STATED OBJECTIVES: Content mastery; process acquisition; attitudinal changes.

K. LOCATION OF LIST OF OBJECTIVES: Overview Book. Specific

course content objectives are listed in the Teacher Folios.

L. SPECIFIC SUBJECTS, GRADE AND AGE LEVELS: The physical sciences (geology, astronomy, physics, chemistry and mathematics). Appropriate for grades 8-10.

M. DESCRIPTION OF MATERIALS ALREADY PRODUCED:
1. Progress Reports.
Course Materials:
2. Student investigation books - 1 through 9.
3. Teacher folios: Provisional edition - 1 through 9 and published edition - 1 through 4.
4. Laboratory equipment and supplies.
5. Overview Book (in preparation).
6. Science reading series 3.

N. MATERIALS AVAILABLE FREE: Progress Reports; Publisher's course description pamphlet available from: Webster Division; McGraw Hill Book Company; Manchester Road; Manchester, Missouri 63011.

O. MATERIALS PURCHASABLE: Items 2 through 6 are purchasable from Webster Division of McGraw-Hill (See address above). Information on cost can be obtained from them also.

P. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

Q. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: None, at present.

R. PROJECT IMPLEMENTATION:
1. Number of teachers using materials: 500 (rough estimate).
2. Number of students involved: 20,000 (rough estimate).
3. Number of schools involved: 300 (rough estimate).
4. Sources of totals in 1, 2, and 3 above: Publisher provided information.
5. Name and location of specific schools where course is being taught: This information may be obtained from the publisher.
6. Availability of consultants for teachers: The publisher provides 5 full-time, traveling science consultants who give in-service institutes of 1-5 days in length. They also provide 30 per-diem consultants.
7. Activities conducted for in-service teacher training: Staff members participate in training consultants and resource people who then go out into the field, run institutes and otherwise help to implement the course.
8. Implementation procedures in addition to above: Extension courses on the teaching of Time, Space, and Matter are being offered at some colleges around the country.
9. Implementation procedure, seemingly, the most effective: An initial institute and available local consultant help.
10. How evaluated: Subjectively, at present.

S. PROJECT EVALUATION:
1. Evaluation conducted by: Dr. Peter Taylor, Department of Educational Psychology of Graduate School of Education, Rutgers-

The State University, in cooperation with the Secondary School Science Project.
2. Instruments used: Tests designed specifically for the study of Time, Space, and Matter.
3. Control groups: Study will not involve extensive comparisons with other curricula of any sort.
4. Feedback process: Administration of instruments on a local level by staff members. Subsequent nationwide standardization with data analysis by staff at Rutgers.
5. Research evidence of objectives achieved: Teacher feedback from trial teaching during development stages.
6. Availability of evidence: Not available at the moment. Instruments and results of study will become available after standardization.

T. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: Work on published version of Time, Space, and Matter; work on course evaluation; move to Rutgers and subsequent work on teacher training.

U. PLANS FOR THE FUTURE: Completion of Time, Space, and Matter in published form; continued work on course evaluation; preparation of video-tapes for teacher training purposes; development of resource people to aid in teacher training.

A. PROJECT TITLE: SOCIAL STUDIES CURRICULUM PROGRAM, EDUCATION DEVELOPMENT CENTER (EDC).

B. PROJECT DIRECTOR: Peter B. Dow, EDC, 15 Mifflin Place, Cambridge, Massachusetts 02138.

C. PROJECT HEADQUARTERS:
1. Contact: Miss Harriet Reif, Librarian, EDC.
2. Special facilities or activities available for visitor viewing: Miss Reif has materials available for inspection. Arrangements can be made for visitors to view films and other audio-visual aids.

D. PRINCIPAL PROFESSIONAL STAFF: Lawrence H. Fuchs, Vice President for the Social Studies and Humanities, EDC; Peter B. Dow, Director, Social Studies Curriculum Program, EDC; Duncan Yaggy, Tenth Grade Course Director; Nona Plessner, Eighth Grade Course Director; Costello Bishop, Production Director; Edward A. Hamilton, Art Director; Anita Mishler, Director of Teacher Training.

E. PROJECT SUPPORT:
1. Organizational sponsorships: (Not answered).
2. Funding agencies: The National Science Foundation, The Ford Foundation, The Carnegie Corporation.

F. PROJECT HISTORY:
1. Principal originators: James R. Killian, M.I.T.; Jerrold Zacharias, M.I.T.; Elting E. Morison, M.I.T.; Franklin Patterson, Tufts; Jerome S. Bruner, Harvard.
2. Date and place of initiation: June 1962; M.I.T., Endicott House.
3. Reason for initiation: "...Called to explore possibilities of social studies curriculum revision, the meeting (in June 1962) was the creation of Jerrold Zacharias...(it was agreed) that the teaching of the general fields of social studies and the humanities was desperately in need of improvement in the elementary and secondary schools of the country..." A Short History of the Social Studies Program, Spring 1965.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PURPOSES AND OBJECTIVES: The general aims of the program are to carry out research and development of social studies curricula, elementary through senior high; to produce new teaching materials, and to implement the teaching of this curricula. The units are intended to be models that others may follow in their own way, and are not meant to be the final word on social studies curriculum. Highly competent scholars have been deeply involved in all of the units throughout the development process, for one important aim of the curriculum is to base the materials on the best and most up-to-date scholarship in history and the social sciences. The materials are designed to allow the students themselves to participate in the methods of such scholarship. Another aim of the curriculum is to involve students in the important questions and problems of society and history. The staff wants to make the subject matter relevant

to young people living in twentieth century America; thus the questions raised and problems discussed have meaning in today's world as well as the past. Children will be presented with data, but must come to their own conclusions, for the curriculum is not provided with "right" answers. The teaching methods used are at least as important as content. "Discovery" or "inductive" learning is crucial to the pedagogy of the materials. For this reason, the textbook has been abandoned and a variety of written and other instructional materials put in its place. Films, tapes, slides, games, artifacts, original documents, and a number of manipulative devices are used throughout the units in an effort to teach children who learn best through media other than print. Since the staff hopes the program will be able to help bring real change in American's schools, contact with teachers through implementation programs is one of the prime objectives. Their past and present activities in this line are described in Section R, and the staff is currently making plans to expand the program in this important area.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study; laboratory investigations; discussion groups; films, tapes, slides, games, 3-dimensional materials, artifacts, original documents, other manipulative devices.

J. ORIENTATIONS OF STATED OBJECTIVES: Content mastery; process acquisition; attitudinal changes; scientific literacy; career guidance.

K. LOCATION OF LIST OF OBJECTIVES: Each unit's specific objectives are found in its accompanying teachers manual. In addition, the objectives of the Elementary Program are discussed in "Man: A Course of Study," a booklet containing papers by Jerome S. Bruner and Peter B. Dow. Occasional Paper No. 4, "Man and Politics" by Franklin Patterson sets out the objectives of the Junior High School sequence.

L. SPECIFIC SUBJECTS, GRADE AND AGE LEVELS: Social sciences (anthropology, sociology, psychology, economics) and history, grades 5, 7, 8, 9, 10.

M. DESCRIPTION OF MATERIALS ALREADY PRODUCED:

Man: A Course of Study - Grade 5:

1. "Perspectives on Man and Animals". To help answer the question "What makes man human?," the fifth grade course opens with a unit which gives children the opportunity to closely observe the lives of animals. Through comparisons and contrasts with animals such as the salmon, herring gull, and baboon, children are led to think concretely about what it means to be human. Structural and behavioral adaptations, group organization and animal communication are important aspects of the animal studies.
2. "The Netsilik Eskimos". This unit consists of an in-depth examination of one group of people, the Netsilik Eskimos of Pelly Bay in Canada. The materials are built around three

important aspects of Netsilik society--their technology, social organization, and world view.

Inventing the Western World - Grade 7:
3. "The Death of a Republic: A Study from Roman History". This unit focuses on Rome in the first century B. C., the time of the end of the republic and the dictatorship of Caesar. The issues raised have meaning in today's world: the corruption of power, civil liberties in conflict with state authority, tradition as a salutary check or as a stumbling block to innovation, war as an extension of politics, the principles of republicanism in conflict with the emerging power of autocracy. Children read original documents and the writings of ancient Romans; they participate in elections; they hear speeches--but the course offers no definitive answers as to why the Republic collapsed.

From Subject to Citizen - Grade 8:
4. "Queen Elizabeth: Conflict and Compromise". This unit examines a number of conflicts--political, social, and economic--between the Crown and its subjects. From such conflicts and subsequent compromises, the English and American political systems developed.
5. "The King Versus the Commons". Charles I did not see the necessity for compromise. This unit deals with the period from approximately 1625-1688, and is a study of the breakdown of the King's power and the consequent development of a viable arrangement between the King and Parliament based on law.
6. "The Emergence of the America". This unit examines what happened when English social and political ideas were transplanted to a new setting. The unit focuses on individuals who settled the land and examines how the Englishmen who first came to American were changed after a century and a half in the New World.
7. "The Making of the American Revolution". After this long period of developing independence, Americans had some pretty definite ideas about how they should be governed, and would not accept being challenged by a Parliament 3,000 miles away. Students examine the prelude to the outbreak of war and try to answer the question, "How do men come to oppose governmental authority, even to the point of war?".
8. "The Constitution". In this unit students study the Constitution, as one step in the attempts to make the political system work. The central question asked is "How does the Constitution help the citizen?" Events studied take place in the present as well as the past.

The Civic Culture - Grade 9:
9. "Irish-Americans". Three main questions are raised in the Irish unit: What is the relationship of religious conflict to politics in the United States? How did the poverty of the Irish affect their political behavior? How did the Irish affect the politics of all Americans?
10. "Afro-Americans". The central question of this unit is

"How, in the face of persistent and pervasive persecution, has the Afro-American survived and begun to build a culture and identity of his own?" The approach to an answer to this question focuses on politics from slave times to the civil rights movement. More diversified use of media will be included in conjunction with printed material when the unit is revised.

Units now in development:
"The Kung Bushmen". This short unit is now being developed for use in "Man: A Course of Study" and will offer an opportunity for children to examine a hunting and gathering society which presents a number of comparisons and contrasts both to Netsilik society and our own.

"Modernization" - Grade 10. A series of units are currently being developed which deal directly with change in society during the past two centuries and raises crucial issues for young people living in today's highly technological world. The theme of the course is modernization. Through a study of contemporary documents--letters, diaries, speeches, etc.--students will see what people in this changing world of the past experienced and how they adjusted to life in an industrial order.

N. MATERIALS AVAILABLE FREE: Available from Miss Harriet Reif, Librarian:
A Short History of the Social Studies Program.
Man: A Course of Study by Jerome S. Bruner and Peter B. Dow.
Occasional Paper No. 4 - "Man and Politics" by Franklin Patterson.
Occasional Paper No. 7 - "Games for Learning" by Clark C. Abt.
Occasional Paper No. 9 - "The Game of Empire" by Peter Wolff.
Occasional Paper No. 10 - "The Grouptalk" by Babette S. Whipple.
EDC Catalog, January 1968.
EDC Annual Report, January 1968.

O. MATERIALS PURCHASABLE: Items 1 and 2 - classroom sets will be available for purchase by school systems who participate in the teacher ning program. Address inquiries to Mrs. Anita Mishler. Sample copies also available for purchase in September 1968. Item 4, $87.00 per classroom set. Privately printed in limited copies for the 1968-69 school year. Address inquiries to Mr. Costello Bishop.

Films: These are all 16mm films. Prints are available for preview-loan or purchase from the Film Librarian, Education Development Center, 55 Chapel Street, Newton, Massachusetts 02160. Interim purchase prices are listed pending commercial distribution.
Baboon Films (sound, color)
-The Young Infant: Birth to Four Months (10 minutes), $70.00.
-The Older Infant: Four Months to One Year (8 minutes), $55.00.
-The Baboon Troop, (in preparation).
-Dynamics of Male Dominance in a Baboon Troop (30 minutes),

$210.00.
-Evening Activity (5½ minutes), $40.00.
-Observing Baboons from a Vehicle (5 minutes), $35.00.
-Animals in Amboseli (20 minutes), $140.00.

Netsilik Eskimos: Fishing at the Stone Weir (2 parts) (silent, color), $400.00.

Corn and the Origins of Settled Life in Meso-America (2 parts) (sound, color), $275.00.

Land and Water in Iraq (sound, color, 13 minutes), $90.00.

Archaeology in Mesopotamia (sound, color, 16 minutes), $110.00.

Earliest Writing (sound, color, 11 minutes), $75.00.

Film Loops: These are 8mm cartridge loops, color, 3 to 4 minutes, to be used with the Technicolor Projector. They show aspects of the technology of the Dani people, inhabitants of the highlands of New Guinea. Available from the EDC Film Library, the price is $7.50 each or $25.00 for the set of four.

A Tool to Make a Tool, $7.50.
Digging Sticks, $7.50.
Chopping and Splitting, $7.50.
Fire Making, $7.50.

P. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

Q. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: None at present.

R. PROJECT IMPLEMENTATION:

1. Number of teachers using materials: 260.
2. Number of students involved: 7,720.
3. Number of schools involved: 170.
4. Sources of totals in 1, 2, and 3 above: Numbers are approximate, as many teachers who have participated in the past junior high school testing programs are continuing to use the materials, although not under the direct supervision.
5. Name and location of specific schools where course is being taught: Since there are 170 schools using the Social Studies Curriculum Project materials, the staff suggests that interested persons contact the project director for the names of schools in their particular locations.
6. Availability of consultants for teachers: All teachers using the materials are invited to call the Social Studies Program at any time to talk with the people who have developed the units.
7. Activities conducted for in-service teacher training: Besides teachers manuals which accompany each unit, a number of in-service workshops have been held during the summers both to train teachers of the materials and to train trainers of teachers. During the summer of 1967 EDC conducted an institute to train teachers to return to their school systems and hold workshops during the school year for the teachers using Man: A Course of Study.
8. Implementation procedures in addition to above: EDC is developing curriculum materials using a variety of media to be

used in teacher training.
9. Implementation procedure, seemingly, the most effective: Although opinions differ on this, the consensus seems to be that in-service workshops are the most effective implementation procedure.
10. How evaluated: Opinions of teachers and staff. The Harvard Office of Tests is conducting a more formal evaluation of the workshops being held for Man: A Course of Study during the 1967-68 school year.

S. PROJECT EVALUATION:
1. Evaluation conducted by: Office of Tests, Harvard University, Cambridge, Massachusetts.
2. Instruments used: Pre- and post-tests, unit tests, classroom checklists, teacher observations, taped interviews with both students and teachers.
3. Control groups: None used.
4. Feedback process: Verbal and written reports of staff and participating teachers.
5. Research evidence of objectives achieved: See Section S4.
6. Availability of evidence: Some reports available on request. Contact Mrs. Eunice Moo, 15 Mifflin Place, Cambridge, Mass. 02138.

T. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: Continued development of curriculum materials for grades 5, 8, 9, and 10. The training of teacher trainers. Negotiations with commercial publishers for publication of the eighth and fifth grade materials.

U. PLANS FOR THE FUTURE: Plans being made and conferences arranged for development of materials for the fourth, sixth, seventh, ninth, eleventh, and twelfth grades. Materials from the fifth and eighth grade courses to be commercially available by Setpember 1969. Plans being made for the development of regional teacher training centers to carry out implementation programs in conjunction with a commercial publisher.

A. PROJECT TITLE: SOCIOLOGICAL RESOURCES FOR SECONDARY SCHOOLS (SRSS).

B. PROJECT DIRECTOR: Robert C. Angell, 503 First National Building, Ann Arbor, Michigan 48108. Tel. 313-665-9147.

C. PROJECT HEADQUARTERS:
1. Contact: Robert C. Angell, Executive Director, SRSS.
2. Special facilities or activities available for visitor viewing: None.

D. PRINCIPAL PROFESSIONAL STAFF: Robert C. Angell, Executive Director; Everett K. Wilson, Sociologist-in-Chief; Robert S. McCargar, Staff Sociologist; William M. Hering, Jr., Assistant Director for School Liaison; F. Lincoln Grahlfs, Supervisor of Evaluation; Thomas J. Switzer, Teacher-Designer; James S. Eckenrod, Teacher-Designer; Corinne Janssens, Editor; Joan Barth, Associate Editor.

E. PROJECT SUPPORT:
1. Organizational sponsorship: American Sociological Association.
2. Funding agency: Course Content Improvement Section--National Science Foundation.

F. PROJECT HISTORY:
1. Principal originators: Committee on the Social Studies Curriculum of American Secondary Schools, American Sociological Association (Professor Neal Gross, Harvard University, Chairman).
2. Date and place of initiation: August 1, 1964; Dartmouth College, Hanover, New Hampshire.
3. Reason for initiation: To provide better quality and greater quantity of sociological materials with an inductive approach for senior high schools.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PURPOSES AND OBJECTIVES: To develop superior instructional materials accurately characterizing sociology as a scientific discipline and easily adapted to use in social studies courses in the senior high school. These materials will include approximately 35 short instructional units (episodes), a one semester sociology course, and a series of paperback books, containing articles from sociology journals, rewritten for high school use. The purpose of these materials is to convey, in so far as possible, an accurate conception of sociological inquiry. Attitude or behavioral change is a by-product rather than an objective--a grasp of the sociological perspective and an awareness of scientific findings in this field can hardly help but effect students' thinking about current issues. SRSS differs from similar projects in that it does not write materials, but rather edits and prepares materials written by teams consisting of sociologists and classroom teachers. Forty such teams have been commissioned to prepare materials. The Sociology course is also the result of such commissioning, although the number of teams is eight,

and the SRSS staff does prepare both the p[illegible]ogue and the epilogue. The extensive evaluation procedure may also distinguish SRSS from some other projects.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Laboratory investigations.

J. ORIENTATIONS OF STATED OBJECTIVES: Content mastery, process acquisition.

K. LOCATION OF LIST OF OBJECTIVES: Informational Materials Brochure; Prospectus; Introduction to each unit.

L. SPECIFIC SUBJECTS, GRADE AND AGE LEVELS: All secondary school social studies courses, with emphasis on grades 11 and 12.

M. DESCRIPTION OF MATERIALS ALREADY PRODUCED: Twelve episodes currently produced, others yet to be produced, each dealing with a limited topic important to the curriculum and to which sociology has made a significant contribution. They are designed to be used in existing social studies courses as well as sociology. Each episode includes audiovisual materials, readings, and inductive exercises for students as well as both a student and teacher manual.

N. MATERIALS AVAILABLE FREE: A newsletter is sent upon request to interested persons. An informative brochure and occasional papers are also available.

O. MATERIALS PURCHASABLE: After evaluation certain episodes which require little if any revision will be released <u>for examination only</u> at a cost of $1 per episode, including both student and teacher manuals. The newsletter contains specific information as to availability of those episodes.

P. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

Q. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: None.

R. PROJECT IMPLEMENTATION:

1. Number of teachers using materials: Over 500 teachers have been involved in experimentation with materials.
2. Number of students involved: Approximately 1,500 students have studied some experimental material.
3. Number of schools involved: Approximately 400-500 schools.
4. Sources of totals in 1, 2, and 3 above: Eleven episodes have been evaluated by approximately 40 teachers per episode; teachers developing materials, numbering over 75, have also used their own units; each class is estimated at 30 students.
5. Name and location of specific schools where course is being taught: The evaluation of the course will occur in the spring of 1968, and school locations are not yet known. Over 400 classes will evaluate the course.
6. Availability of consultants for teachers: None available.
7. Activities conducted for in-service teacher training: None.
8. Implementation procedures in addition to above: Cooperation

with directors of summer institutes in sociology.

S. PROJECT EVALUATION:

1. Evaluation conducted by: Mr. F. Lincoln Grahlfs in cooperation with the Psychological Corporation in developing and administering evaluative instruments.
2. Instruments used: Pre-tests and post-tests of content mastery and knowledge of the "sociological perspective;" a standardized verbal reasoning test and a student information form.
3. Control groups: Students in the sample are matched according to ability and socio-economic background. Students serving as a control group for one episode are the experimental group for another and vice versa.
4. Feedback process: The feedback process consists of the results of content mastery tests as well as teacher questionnaires and personal visits by staff members to many of the classes.
5. Research evidence of objectives achieved: A full report on each episode is prepared as feedback is obtained and analyzed. It contains an item-analysis of the content mastery test.
6. Availability of evidence: Interested persons should write to Mr. F. Lincoln Grahlfs, Supervisor of Evaluation for further details.
7. Other pertinent information: The course evaluation will follow a similar pattern, although details have not yet been finalized.

T. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: The staff has been enlarged and several additional tentative materials have been produced.

U. PLANS FOR THE FUTURE: The evaluation of short units will continue. Three paperback books and the course will have been prepared by the summer of 1968, though not published. The episodes will reach the publication stage early in 1968 and will appear in groups of four through 1970. The paperback books will be published at the rate of two a year. The course will be published early in 1971.

A. PROJECT TITLE: SPECIAL MATERIALS SCIENCE PROJECT (SMSP).

B. PROJECT DIRECTOR: John J. Rizza, Sunrise Dr., RFD #4, Mahopac, N.Y. 10541. Tel. 914-528-5818.

C. PROJECT HEADQUARTERS:
1. Contact: John J. Rizza, SMSP, Mahopac High School, Mahopac, N.Y. 10541. Tel. 914-628-3415.
2. Special facilities or activities available for visitor viewing: None.

D. PRINCIPAL PROFESSIONAL STAFF: John J. Rizza, Director; Margaret Stevens, Middle School Teacher; Vincent Gizzi, Physical Science Teacher; Donald C. Pratt, Science Specialist; M. James Lynch, Science Supervisor.

E. PROJECT SUPPORT:
1. Organizational sponsorship: Mahopac Board of Education.
2. Funding agency: ESEA Title I, Office of Education.

F. PROJECT HISTORY:
1. Principal originators: John J. Rizza, Donald C. Pratt.
2. Date and place of initiation: May 1966; Mahopac High School.
3. Reason for initiation: To develop a science program for children lacking interest or ability (slow learners).

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PURPOSES AND OBJECTIVES: To develop a program of science instruction and activities for "slow learners" in science in the middle school grades (6-8); to allow the stimulation of activities to interest these children in learning; to develop kits to be used in conjunction with course units.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study, laboratory investigations, discussion groups.

J. ORIENTATIONS OF STATED OBJECTIVES: Process acquisition, attitudinal changes.

K. LOCATION OF LIST OF OBJECTIVES: In the teachers commentary.

L. SPECIFIC SUBJECTS, GRADE AND AGE LEVELS: Science and Math grades 6-8.

M. DESCRIPTION OF MATERIALS ALREADY PRODUCED:

Project Alpha I

A. Observing and Recording - four activities which involve children in making careful observations and recording data.
B. Measurement - A series of activities which continue to develop the ability to observe and record. For example,
1. Estimation of the number of lima beans in a liter container by various methods, including weighing, measuring, and volume determination.
2. Determination of the need for a system of temperature measurement. This is followed by the construction and calibration of a thermometer.

3. Measurement of a living thing - the radish seedling is made by constructing a graph to compare root and stem growth.

C. Natural History. Animals - in this unit, the child has an opportunity to research the natural history of an animal of his choosing. The unit culminates with the construction of a simple classification key, based on the animals studied by individual class members.

D. A Study in Ecology: The Aquarium - The purposes of this unit are to give children an opportunity to make their own aquaria, care for them, and make observations on simple ecological relationships.

Project Alpha II

A. Observation and Measurement - The overall objectives are to further develop observation abilities and introduce methods of metric measurement.

1. Observing the Weather. Activities which teach students to use standardized symbols to record weather conditions. Data are accumulated daily and compared to determine whether any patterns occur.
2. Day and Night. The unit on weather introduces students to certain concepts concerning interrelationships of various factors of weather, such as association of snow and cold weather, swimming and warm weather, etc. Next develop concepts associated with causes of day and night.
3. The seasons. The previous unit deals directly into discussion of the causes of the seasons. Activities are performed to permit a visualization of positions of the earth and sun, and the effect of direct and indirect lighting in relation to the amount of heat received by the earth.

B. Development-Hatching eggs to study the embryology of the chick in relation to the embryonic development of man, becomes a fascination experience. The chick makes a good experimental animal because of the availability of eggs, its relatively short gestation period, and the ease of removing the embryo from its protective covering. In each stage of development observed in the chick, a comparable stage may be illustrated and discussed in human development.

C. Metric Measurement - To introduce the student to making measurements, to guide him to realize the importance of a standard, and to progress to measurements of area, volume, and weight. Construction and calibration of units for each measurement are completed by each student.

D. Electricity.

1. Students learn basics of electric circuit construction.
2. Inferred patterns are determined by using circuit boards with different circuit patterns.
3. A survey of materials is made to determine conductors and non-conductors.

E. Innovation in Microscopy - Our objective is to develop the

concept of magnification and how it helps us to see the "invisible" world. Start with a drop of water as a magnified. This will be followed by other methods of magnification and culminate with the compound microscope. The compound microscope will then be used to study micro-organisms.
Summary Articles to be found in:
A. The Science Teacher, Dec. 1967, Vol. 34, No. 9, page 32.
B. The Grade Teacher, Jan. 1968, page 93.

N. MATERIALS AVAILABLE FREE: Teachers Commentary.

O. MATERIALS PURCHASABLE: Undecided at this time.

P. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

Q. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: Possibility of materials being translated into Spanish for use in South America and Puerto Rico.

R. PROJECT IMPLEMENTATION:
1. Number of teachers using materials: 5.
2. Number of students involved: 75.
3. Number of schools involved: 1.
4. Sources of totals in 1, 2, and 3 above: Use of materials by teachers in grades 6, 7, 8 during past 2 years.
5. Name and location of specific schools where course is being taught: Mahopac Middle School.
6. Availability of consultants for teachers: Available. Director meets with teachers for informal instruction.
7. Activities conducted for in-service teacher training: Undecided at this time.

S. PROJECT EVALUATION:
1. Evaluation conducted by: Project director and school psychologist.
2. Instruments used: School & College Ability Test; Sequential Test of Educational Progress; behavioral checklist; anecdotal records.
3. Control groups: Yes. Identified as having similar characteristics as those students involved in program.
4. Feedback process: Observations by director on classes; teacher evaluation and suggestions of program materials and student progress.
5. Research evidence of objectives achieved: Observations of improved attitudes by teachers; increased score on standardized tests.
6. Availability of evidence: Informal.

T. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: Revision of materials in summer of 1967.

U. PLANS FOR THE FUTURE: Project Alpha III - additional units to be developed during 1967-68 school year.

A. PROJECT TITLE: STANFORD-BRENTWOOD COMPUTER-ASSISTED INSTRUCTION LABORATORY.

B. PROJECT DIRECTOR: Professor Patrick Suppes and Professor Richard C. Atkinson, Institute for Mathematical Studies in the Social Sciences, Ventura Hall, Stanford University, Stanford, California 94305. Tel. DA1-2300.

C. PROJECT HEADQUARTERS:
1. Contact: Professor Patrick Suppes (Mathematics) or Professor Richard C. Atkinson (Reading), Brentwood Elementary School, 2086 Clarke Avenue, East Palo Alto, California. Tel. 325-1560.
2. Special facilities or activities available for visitor viewing: Tour of the laboratory.

D. PRINCIPAL PROFESSIONAL STAFF:
1. Professor Patrick Suppes, Project Director; Professor Richard C. Atkinson, Project Director; Mrs. Jamesine Friend, Director of Mathematics Curr. Group; Dr. Haralee Wilson, Director of Reading Curriculum.

E. PROJECT SUPPORT:
1. Organizational sponsorship: Stanford University.
2. Funding agency: U.S. Office of Education.

F. PROJECT HISTORY:
1. Principal originators: Prof. Patrick Suppes and Prof. Richard C. Atkinson.
2. Date and place of initiation: Summer 1964; Stanford-Brentwood CAI Laboratory, East Palo Alto, California.
3. Reason for initiation: To investigate CAI in elementary grades over an extended period of time.

G. PRESENT COMMERCIAL AFFILIATIONS: No direct commercial affiliations. Equipment being used has been purchased or leased from IBM, Philco, Westinghouse, and Digital Equipment Corporation.

H. PURPOSES AND OBJECTIVES: To develop a full tutorial program in primary-school mathematics and reading.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study; programmed instruction; computer assisted instruction; classroom instruction.

J. ORIENTATIONS OF STATED OBJECTIVES: Content mastery; process acquisition.

K. LOCATION OF LIST OF OBJECTIVES: (Not answered).

L. SPECIFIC SUBJECTS, GRADE AND AGE LEVELS: First and second grade mathematics and reading.

M. DESCRIPTION OF MATERIALS ALREADY PRODUCED: A large body of curriculum material encoded for use in computer systems. (Not available for distribution).

N. MATERIALS AVAILABLE FREE:

1. Suppes, P. Mathematical concept formation in children. American Psychologist, 1966, 21, 139-150.
2. Suppes, P. Concept formation and Bayesian decisions. In J. Hintikka and P. Suppes (Eds.), Aspects of Inductive Logic. Amsterdam: North-Holland Publishing Co., 1966. Pp. 21-48.
3. Suppes, P. Tomorrow's education? Education Age, 1966, 2, 4-11.
4. Suppes, P. The psychology of arithmetic. In J. Bruner (Ed.), Learning about Learning (a Conference Report). Washington: U.S. Government Printing Office, 1966. Pp. 235-242.
5. Suppes, P. Accelerated program in elementary-school mathematics--The second year. Psychology in the Schools, 1966, 3, 294-307.
6. Suppes, P. The axiomatic method in high-school mathematics. The Role of Axiomatics and Problem Solving in Mathematics. The Conference Board of the Mathematical Sciences, Washington, D.C. Ginn and Co., 1966. Pp. 69-76.
7. Suppes, P. The uses of computers in education. Scientific American, 1966, 215, 206-221. Reprinted in Information, A Scientific American Book. San Francisco: W.H. Freeman and Co., 1966. Pp. 157-174.
8. Suppes, P. Computer-based instruction. Electronic Age, 1967, 26, 2-6.
9. Suppes, P. The psychological foundations of mathematics. Les Modeles et la Formalisation du Comportement. Colloques Internationaux du Centre National de la Recherche Scientifique. Editions du Centre National de la Recherche Scientifique. Paris: 1967. Pp. 213-242.
10. Suppes, P. Applications of mathematical models of learning in education. In H.O.A. Wold (Scientific Organizer), Model Building in the Human Sciences. Entretiens de Monaco en Sciences Humaines, Session 1964. Monaco: Union Europeenne D'Editions, 1967. Pp. 39-49.
11. Suppes, P. The teacher and computer-assisted instruction. NEA Journal, February 1967, 15-17.
12. Suppes, P. The case for information-oriented (basic) research in mathematics education. In J.M. Scandura (Ed.), Research in Mathematics Education. Washington, D.C.: NCTM, 1967. Pp. 1-5.
13. Suppes, P. The computer and excellence. Saturday Review, January 1967, 46-50.
14. Suppes, P. What is a scientific theory? In S. Morgenbesser (Ed.), Philosophy of Science Today. New York: Basic Books, Inc., 1967. Pp. 55-67.
15. Suppes, P. On using computers to individualize instruction. In D.D. Bushnell & D.W. Allen (Eds.), The Computer in American Education. New York: Wiley, 1967. Pp. 11-24.
16. Suppes, P. Some theoretical models for mathematics learning. Journal of Research and Development in Education, 1967, 1, 5-22.
17. Suppes, P. Information processing and choice behavior. In

I. Lakatos, & A. Musgrave, Problems in the Philosophy of Science. Amsterdam: North-Holland Publishing Co., 1968. Pp. 278-299.
18. Suppes, P., & Groen, G. Some counting models for first grade performance data on simple addition facts. In J.M. Scandura (Ed.), Research in Mathematics Education. Washington, D.C.: NCTM, 1967. Pp. 35-43.
19. Suppes, P., Hyman, L., & Jerman, M. Linear structural models for response and latency performance in arithmetic on computer-controlled terminals. In J.P. Hill (Ed.), Minnesota Symposia on Child Psychology. Minneapolis, Minn.: 1967. Pp. 160-200.
20. Suppes, P., & Ihrke, C. Accelerated program in elementary school mathematics--The third year. Psychology in the Schools, 1967, 4, 293-309.
21. Suppes, P., Jerman, M., & Groen, G. Arithmetic drills and review on a computer-based teletype. The Arithmetic Teacher, April 1966, 303-309.
22. Suppes, P., & Roberts, F.S. Some problems in the geometry of visual perception. Synthese, 1967, 17, 173-201.
23. Suppes, P., & Zinnes, J.L. A continuous-response task with nondeterminate, contingent reinforcement. Journal of Mathematical Psychology, 1966, 3, 197-216.

O. MATERIALS PURCHASABLE: None.

P. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

Q. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: None.

R. PROJECT IMPLEMENTATION:

1. Number of teachers using materials: Math: 3; reading: 4.
2. Number of students involved: Math: 62; reading: 78.
3. Number of schools involved: One.
4. Sources of totals in 1, 2, and 3 above: Institute records.
5. Name and location of specific schools where course is being taught; Brentwood Elementary School, East Palo Alto, Calif.
6. Availability of consultants for teachers: Available; to provide assistance in developing and producing classroom curriculum materials, attending to administrative details, and interpreting and alleviating technological problems.
7. Activities conducted for in-service teacher training: Provide curriculum content seminars, curriculum lectures, and workshops. Teachers may also work through curriculum materials using computer-assisted instruction equipment.
8. Implementation procedures in addition to above: Through normal school operations including faculty meetings and school committees such as the Curriculum Committee, etc.
9. Implementation procedure, seemingly, the most effective: Weekly discussion program.
10. How evaluated: Formal and informal interviews and questionnaires.

S. PROJECT EVALUATION:

1. Evaluation conducted by: Staff of the Institute for Mathematical Studies in the Social Sciences.
2. Instruments used: (Not answered).
3. Control groups: (Not answered).
4. Feedback process: (Not answered).
5. Research evidence of objectives achieved: Standardized achievement tests including measurement instruments developed at the Institute for Mathematical Studies in the Social Sciences.
6. Availability of evidence: (Not answered).

T. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: Math: development and production of a second grade curriculum, seminar and lecture program for teachers. Reading: massive revision of instructional materials, development and production of additional levels of material, 6-week in-service workshop for teachers.

U. PLANS FOR THE FUTURE: (Not answered).

S. PROJECT EVALUATION:

1. Evaluation conducted by: Staff of the Institute for Mathematical Studies in the Social Sciences.
2. Instruments used: (Not answered).
3. Control groups: (Not answered).
4. Feedback process: (Not answered).
5. Research evidence of objectives achieved: Standardized achievement tests including measurement instruments developed at the Institute for Mathematical Studies in the Social Sciences.
6. Availability of evidence: (Not answered).

T. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: Math: development and production of a second grade curriculum, seminar and lecture program for teachers. Reading: massive revision of instructional materials, development and production of additional levels of material, 6-week in-service workshop for teachers.

U. PLANS FOR THE FUTURE: (Not answered).

A. PROJECT TITLE: SURVEY OF RECENT EAST EUROPEAN LITERATURE IN SCHOOL AND COLLEGE MATHEMATICS.

B. PROJECT DIRECTOR: Professor Alfred L. Putnam, Department of Mathematics, Eckhart Hall 411, The University of Chicago, Chicago, Illinois 60637. Tel. 312-MI 3-0800, ext. 2750. Professor Izaak Wirszup, Department of Mathematics, Eckhart Hall 413, The University of Chicago, Chicago, Illinois 60637. Tel. 312-MI 3-0800, ext. 2741.

C. PROJECT HEADQUARTERS:
1. Contact: Project Director, Survey of Recent East European Literature in School and College Mathematics, Department of Mathematics, Eckhart Hall 410, The University of Chicago, Chicago, Illinois 60637. Tel. 312-MI 3-0800, ext. 2753.
2. Special facilities or activities available for visitor viewing: A library consisting of over 5000 books and periodicals, principally Russian, on mathematics and its applications, on mathematics education, and on science.

D. PRINCIPAL PROFESSIONAL STAFF: Randell W. Magee, Editorial Assistant.

E. PROJECT SUPPORT:
1. Organizational sponsorships: University of Chicago, Department of Mathematics.
2. Funding agency: National Science Foundation.

F. PROJECT HISTORY:
1. Principal originators: A.F. Bausch, W.H.L. Meyer, A.L. Putnam, I. Wirszup.
2. Date and place of initiation: 1956; University of Chicago.
3. Reason for initiation: To answer urgent need to make available information and materials in mathematics and mathematics education from East European sources.

G. PRESENT COMMERCIAL AFFILIATIONS: Publishers: D.C. Heath & Co., Holden-Day, Pergamon Press, Academic Press, The M.I.T. Press.

H. PURPOSES AND OBJECTIVES: Principal aims of the Survey: To develop an extensive information program on current Soviet and other East European mathematics at the school and college level; to make available from these sources mathematical materials for teachers and students in American schools and colleges.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: (Not applicable).

J. ORIENTATIONS OF STATED OBJECTIVES: (Not applicable).

K. LOCATION OF LIST OF OBJECTIVES: (Not applicable).

L. SPECIFIC SUBJECTS, GRADE AND AGE LEVELS: From kindergarten through college level; mathematics and mathematics education.

M. DESCRIPTION OF MATERIALS ALREADY PRODUCED: Survey publications by D.C. Heath & Co., 285 Columbus Avenue, Boston 16, Mass.:

Titles in the series Topics in Mathematics are:
1. Algorithms and Automatic Computing Machines by B.A. Trakhtenbrot.
2. Areas and Logarithms by A.I. Markushevich.
3. Computation of Areas of Oriented Figures by A.M. Lopshits.
4. Configuration Theorems by B.I. Argunov and L.A. Skornyakov.
5. Equivalent and Equidecomposable Figures by V.G. Boltyanskii.
6. The Fibonacci Numbers by N.N. Vorobyov.
7. How to Construct Graphs by G.E. Shilov, with Simplest Maxima and Minima Problems by I.P. Natanson.
8. Hyperbolic Functions by V.G. Shervatov.
9. Induction in Geometry by L.I. Golovina and I.M. Yaglom.
10. Introduction to the Theory of Games by E.S. Venttsel.
11. The Method of Mathematical Induction by I.S. Sominskii.
12. Mistakes in Geometric Proofs by Ya. S. Dubnov.
13. Proof in Geometry by A.I. Fetisov.
14. Summation of Infinitely Small Quantitives by I.P. Natanson.
15. What is Linear Programming? by A.S. Barsov.
16. Convex Figures and Polyhedra by L.A. Lyusternik.
17. Eight Lectures on Mathematical Analysis by A. Ya. Khinchin.
18. Multicolor Problems by E.B. Dynkin and V.A. Uspenskii.
19. Problems in the Theory of Numbers by E.B. Dynkin and V.A. Uspenskii.
20. Random Walks by E.B. Dynkin and V.A. Uspenskii.
21. Infinite Series by A.I. Markushevich.

In Press:
22. Geometric Constructions in the Plane by B.I. Argunov and M.B. Balk.
23. Geometry of the Straightedge and Geometry of the Compass by S.I. Zetel.
24. Isoperimetry: Maximal and Minimal Properties of Geometric Figures by D.A. Kryzhanovskii.
25. Probability and Information by A.M. Yaglom and I.M. Yaglom.

Survey publications by the School Mathematics Study Group (as volume IV of Studies in Mathematics); available from A.C. Vroman, Inc., 367 South Pasadena Avenue, Pasadena, California:
26. Geometry by B.V. Kutuzov.

Survey publications by Holden-Day, Inc., 728 Montgomery Street, San Francisco 11, California:
27. Challenging Mathematical Problems with Elementary Solutions, vol. I: Combinatorial Analysis by A.M. Yaglom and I.M. Yaglom.
28. Challenging Mathematical Problems with Elementary Solutions, vol. II: Various Branches of Mathematics by A.M. Yaglom and I.M. Yaglom.

Survey publications by Pergamon Press, Inc.; available from the MacMillan Company, 60 Fifth Avenue, New York, New York 10011:
29. Envelopes by V.G. Boltyanskii.
30. Shortest Paths by L.A. Lyusternik.
31. Successive Approximation by N. Ya. Vilenkin.
32. Systems of Linear Equations by B.E. Margulis.

Survey publications by Academic Press, 111 Fifth Avenue, New York, New York 10003:
33. Geometric Transformations (Volume 1: Euclidean and Affine Transformations) by P.S. Modenov and A.S. Parkhomenko.
34. Geometric Transformations (Volume 2: Projective Transformations) by P.S. Modenov and A.S. Parkhomenko.

Survey translations and adaptations from the Russian series Bibliotechka fiziko-matematicheskoi shkoly, under the editorship of Professor I.M. Gelfand, are being published by The M.I.T. Press under the series title Library of School Mathematics.
35. I.M. Gelfand, E.G. Glagoleva, A.A. Kirillov, The Method of Coordinates.

In Press:
36. I.M. Gelfand, E.G. Glagoleva, E.E. Shnol, Functions and Graphs.
37. S.I. Gelfand, M.L. Gerver, A.A. Kirkllov, N.N. Konstantinov, A.G. Kushnirenko, Problems in Elementary Mathematics; Sequences, Combinations, and Limits.
38. E.B. Dynkin, S.A. Molchanov, A.L. Rozental, A.K. Tolpygo, Mathematical Problems.

N. MATERIALS AVAILABLE FREE: Survey Bulletin available from Project Headquarters.

O. MATERIALS PURCHASABLE: Items 1-38 available from publishers listed in Section M.

P. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: Russian.

Q. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: English.

R. PROJECT IMPLEMENTATION: (Not applicable).

S. PROJECT EVALUATION: (Not applicable).

T. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: (Not answered).

U. PLANS FOR THE FUTURE:
1. A joint effort by the School Mathematics Study Group at Stanford University and the Survey of Recent East European Mathematical Literature at the University of Chicago will soon result in the publication of a series of several volumes of translations under the title Soviet Studies in the Psychology of Learning and Teaching Mathematics. The editors of the series are Jeremy Kilpatrick of Stanford University and Izaak Wirszup of the University of Chicago. List of the First Eleven Volumes:
Vol. I: The Learning of Mathematical Concepts.
Vol. II: The Structure of Mathematical Abilities.
Vol. III: Problem Solving in Arithmetic and Algebra.
Vol. IV: Problem Solving in Geometry.
Vol. V: The Development of Spatial Abilities.

Vol. VI: Instruction in Problem Solving.
Vol. VII: Teaching Arithmetic in Elementary School.
Vol. VIII: Methods of Teaching Mathematics.
Vol. IX: Problem-Solving Processes of Mentally-Retarded Children.
Vol. X: Teaching Mathematics to Mentally-Retarded Children.
Vol. XI: Analysis and Synthesis as Problem-Solving Methods.

2. Survey translations and adaptations in preparation for publication: Fetisov, A.I., Geometry, in two volumes; Fomin, S.V., Systems of Counting; Kogan, B. Yu., Application of Mechanics in Geometry; Shilov, G.E., The Musical Scale; Shreider, Yu. A., What is Distance?; Vorobiev, N.N., Texts for Divisibility; Lyubich, Yu. I., Shor, L.A., Kinematic Method in Geometric Problems; Uspenskii, V.A., Pascal's Triangle; Shkolnik, A.G., The Problem of Dividing the Circle; Ostrovskii, A.I., Kordemskii, B.A., Geometry Helps Arithmetic; Itelson, L.B., Mathematical and Cybernetic Methods in Pedagogy; Landa, L.N., Algorithms and Teaching; Moro, M.I., Independent Work for Pupils in Arithmetic Lessons in the Elementary Grades; Pchelko, A.S., Foundations of Methodology Used in Elementary Mathematics Instruction.

A. PROJECT TITLE: TEACHER'S AUTOMATED GUIDE (TAG).

B. PROJECT DIRECTOR: Dr. George S. Ingebo, Director Educational Research and Testing, Portland Public Schools, 631 Northeast Clackamas Street, Portland, Oregon 97208. Tel. 503-234-3392, ext. 223, 335.

C. PROJECT HEADQUARTERS:
1. Contact: George S. Ingebo, TAG.
2. Special facilities or activities available for visitor viewing: One remote station, consisting of character generating cathode ray tube display, a screen, typewritten keyboard and a teleprinter) is in operation at Rice Elementary School. The Cybex Keysort deck "hand computer" will also be available for visitor viewing.

D. PRINCIPAL PROFESSIONAL STAFF: Robert Coffin, director of experimental programming; Thomas F. Crowder, coordinator of information services; LeRoy Moore, curriculum consultant; Louis A. Tesch, Jr., principal of Rice Elementary; Thomas S. Lydon, principal of Wilcox Elementary School; Barbara Raz, basic language programmer; Joyce Olderburg, programmer assistant; John S. Neeley, cybernetics committee chairman.

E. PROJECT SUPPORT:
1. Organizational sponsorship: Portland Public Schools.
2. Funding agency: Louis W. and Maud Hill Family Foundation.

F. PROJECT HISTORY:
1. Principal originator: Donald W. Stotler, Supervisor of Science.
2. Date and place of initiation: June 1964; Portland Public Schools.
3. Reason for initiation: To develop a branching, self-renewing process-oriented science curriculum.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PURPOSES AND OBJECTIVES: To experimentally develop an automated, self-renewing teachers' guide whereby individual pupil data and curriculum alternatives are made accessible to teachers through the computer system. Essential features of the program include ready access to background data on students and their readiness to learn; a wide variety of curriculum activities based on stated behavioral objectives; and a provision for feedback of both pupil and curriculum information to make the system self-correcting and increasingly useful as a professional tool for the teacher.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study, laboratory investigations, discussion groups.

J. ORIENTATIONS OF STATED OBJECTIVES: Content mastery, process acquisition, attitudinal changes.

K. LOCATION OF LIST OF OBJECTIVES: Each cybex (cybernetics experience lesson) has the behavioral objectives stated

along with the explanations of the curriculum activity and the procedures for evaluation. A list of behavioral objectives can be obtained from the computer upon request either for each cybex or for any subset specified by process level or content. The objectives of the TAG program are included in the explanatory materials mailed to anyone requesting them.

L. SPECIFIC SUBJECTS, GRADE AND AGE LEVELS: Science K-4 for a Pilot Program. Expansion K-12 for a three-year developmental period (1967-72). K-14 for Controlled Experiment.

M. DESCRIPTION OF MATERIALS ALREADY PRODUCED:
1. A deck of cards on which are recorded teaching activities classified for computer retrieval according to the objectives of the AAAS elementary science program. These are on Keysort cards organized in much the same way as the science teachers' adaptable curriculum (STAC) cards (see 1964 and 1965 versions of AAAS Clearinghouse Report).
2. Behavioral check list for teachers: To record pupil's successes with various science tasks.

N. MATERIALS AVAILABLE FREE: Sample cybex reproduced by the computer. Description of the TAG program, Portland Public Schools, 631 N. E. Clackamas Street, Portland, Oregon 97208, Educational Research Department.

O. MATERIALS PURCHASABLE: None.

P. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

Q. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: Undetermined.

R. PROJECT IMPLEMENTATION:
1. Number of teachers using materials: 14.
2. Number of students involved: 375.
3. Number of schools involved: 2.
4. Sources of totals in 1, 2, and 3 above: Enrollments and staffs at Rice Elementary School and Wilcox Elementary School.
5. Name and location of specific schools where course is being taught: Rice Elementary School, Portland Oregon; Wilcox Elementary School, Portland, Oregon.
6. Availability of consultants for teachers: Available. A curriculum consultant helps with supplies, feedback on cybexes, evaluation of lessons, and writing new cybexes.
7. Activities conducted for in-service teacher training: Project workshops during the summer, Saturday morning sessions during the year, and weekly in-service classes lasting eleven weeks for in-service credit.
8. Implementation procedures in addition to above: Cooperation with COMBAT, a Computer Based Test Development System being developed by the Metropolitan Area Test Board.
9. Implementation procedure, seemingly, the most effective: The project work sessions.
10. How evaluated: Production of new cybexes by teachers'

critiques of Cybexes as they are used in the classroom.

S. PROJECT EVALUATION:

1. Evaluation conducted by: Portland Public Schools, Department of Research and Testing.
2. Instruments used: Portland City-Wide Testing Program.
3. Control groups: The other schools in the city of Portland.
4. Feedback process: Two kinds of information are fed back into the computer after each classroom science activity. First, the pupil behavioral observations made by the teacher, and second, change in instructional approach worked out by a consultant after use of the activity, based on observations supplied by the teacher. These are fed back into the computer to change or increase the alternatives available to the teacher the next time the activity is called for.
5. Research evidence of objectives achieved: No experimental evidence at this stage of development.

T. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: The remote station is being used at Rice Elementary School supported by another ninety thousand dollar commitment by the Louis W. and Maud Hill Family Foundation. The software for retrieval on the Scope, seven and one-half miles from the computer, is being developed slightly ahead of schedule and more than meeting specifications. Teachers are using the Scope and making the criticisms so necessary for a feedback type of development. The faculty at Wilcox Elementary, a nearby K-6 school, has been instructed in the use of the Scope and the teachers are using it when they wish. Federal funds to facilitate expansion of the project have not been obtained at this time.

U. PLANS FOR THE FUTURE: The staff of teachers and consultants have developed confidence in the abilities of the computer and the software. The focus of attention during the spring of 1968, and possibly the summer of 1968 will be on the more efficient and less time-consuming techniques for teacher recording of information about the performance of pupils relative to the instructional program.

A. PROJECT TITLE: TEACHING MATHEMATICS THROUGH THE USE OF A TIME-SHARED COMPUTER (CAM).

B. PROJECT DIRECTOR: Jesse O. Richardson, Director of Computer Research, Research and Development Center, Massachusetts Department of Education, Olympia Avenue, Woburn, Mass. 01801. Tel. 617-935-4350.

C. PROJECT HEADQUARTERS:
1. Contact: Jesse O. Richardson, Teaching Mathematics Through the use of a Time-Shared Computer (CAM).
2. Special facilities or activities available for visitor viewing: Mathematics instruction in elementary and secondary schools using remote teletypewriter terminals as teaching aids and resource devices; time-shared multi-access, computer facilities providing highly interactive conversational language capabilities (TELCOMP).

D. PRINCIPAL PROFESSIONAL STAFF: Wallace Feurzeig, Technical coordinator for the subcontractor; Walter Koetke, Field supervisor; James Pender, Field supervisor; George Greer, Field supervisor.

E. PROJECT SUPPORT:
1. Organizational sponsorship: Board of Education, Commonwealth of Massachusetts.
2. Funding agency: U.S. Office of Education.

F. PROJECT HISTORY:
1. Principal originators: Owen B. Kiernan; Jesse O. Richardson.
2. Date and place of initiation: June 1, 1965; Boston, Mass.
3. Reason for initiation: To investigate the use of a time-shared computer as a teaching aid for mathematics.

G. PRESENT COMMERCIAL AFFILIATIONS: Technical support and collaboration, and time-shared computer services are furnished by Bolt Beranek and Newman Inc., of Cambridge, Mass.

H. PURPOSES AND OBJECTIVES: A major problem in the field of mathematics education is the development of new teaching tools. This proposed study has as its basic goal the development of a mathematical laboratory based on a time-shared digital computer. In working towards this goal the staff will focus on solving the following problems: (1) how can a time-shared computer be programmed to act as a useful tool for teaching mathematics; (2) how can classroom teachers be taught the necessary techniques to enable them to use this new teaching tool successfully; and (3) how can such multiple-user computer facilities be developed in line with economic constraints.

In addition to demonstrating the economic feasibility of this new approach, the staff plans to test the hypotheses that: a terminal teletypewriter connected to a large computer operated in the time-shared mode will give the mathematics student the feeling of working on his own computer; having the computer on an "always ready" basis will encourage students to

engage extensively in voluntary extracurricular use of the computer terminals; the presence of a continuously available real-time computer in the classroom will lead students to acquire a more thorough grasp of mathematics.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Computer assisted instruction; computer-based programmed instruction.

J. ORIENTATIONS OF STATED OBJECTIVES: Content mastery; process acquisition; attitudinal changes; scientific literacy.

K. LOCATION OF LIST OF OBJECTIVES: CAM Newsletter No. 1.

L. SPECIFIC SUBJECTS, GRADE AND AGE LEVELS: Mathematics curriculum at grades six through twelve; ages 11 through 18.

M. DESCRIPTION OF MATERIALS ALREADY PRODUCED:
1. CAM (Computer-Assisted Mathematics) Newsletter, issued periodically.

N. MATERIALS AVAILABLE FREE: Item 1 available on request from Project Director.

O. MATERIALS PURCHASABLE: None available.

P. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

Q. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: None

R. PROJECT IMPLEMENTATION:
1. Number of teachers using materials: 60.
2. Number of students involved: 400.
3. Number of schools involved: 20.
4. Sources of totals in 1, 2, and 3 above: Totals include schools participating in the project and schools in Title III ESEA projects using the materials.
5. Name and location of specific schools where course is being taught: Massachusetts: Phillips Academy, Andover; Kendall School, Winn Brook School, Belmont; Brookline High School, Brookline; Lexington High School, Lexington; Westwood High School, Westwood; Vinson-Owen School, Winchester. Connecticut: Bloomfield High School, Bloomfield; Manchester High School, Manchester; Platt High School, Meriden. Vermont: Burlington High School, Burlington; Champlain Valley Union High School, Hinesburg.
6. Availability of consultants for teachers: Available. Provide assistance in use of classroom computer terminals, use of the time-shared computer language (TELCOMP), adaptation of current computer-based instructional materials developed in the research project.
7. Activities conducted for in-service teacher training: In-service programs conducted in participating schools by members of project staff.
8. Implementation procedures in addition to above: Groups of educators, teachers from the participating schools involved in the teaching of mathematics at both elementary and secondary

school levels, scientists involved in the time-shared use of computers, and members of the project advisory board were assembled for 6-week workshops. These sessions proceeded to: teach the mathematics teachers the fundamentals of computer usage and the potentials of a real-time computer in the mathematics and science classroom; review and improve the concept-oriented curriculum materials developed for the classes using the computer; evaluate the results of the pilot and operational phases of the experiment; establish a user-group for teachers and students to write and share programs over the course of the study; thoroughly test the computer programs developed during the course of the experiment; develop computer-based instructional materials.

9. Implementation procedure, seemingly, the most effective: Both equally effective.

10 How evaluated: No formal evaluation made.

S. PROJECT EVALUATION:

1. Evaluation conducted by: Professional staff of the project.
2. Instruments used: Sequential Test of Education Progress (STEP), mathematics form 4A, B for grade 6; form 3A, B for grade 9; form 2A, B for grade 11.
3. Control groups: Used for each participating school.
4. Feedback process: Liaison is maintained with the participating schools through the field consultants and project staff. A library file of student and teacher generated computer programs is maintained in the computer memory, available to all user schools. Daily information concerning project activities is distributed through the network of remote teletype terminals to all the participants.
5. Research evidence of objectives achieved: The preliminary results of the research program indicate that: participating teachers and students learned to use the time-shared computer and enjoyed using it; the computer terminals were heavily used by average as well as by gifted students; students used the computer for solving problems in chemistry, biology, physics, and English, as well as mathematics; the programming experience directly motivated many students to learn more mathematics--even away from the computer terminals; in the judgment of teachers, the computer provided many students with an environment for independent mathematical discovery.
6. Availability of evidence: Will be contained in formal project report.
7. Other pertinent information: High school teachers participating in the project summarized their experiences throughout the year as follows: "As the year progressed ... ideas which were generated in a classroom discussion and elaborated by a student at the terminal in his spare time have produced some very original and sophisticated work in diverse fields. Programs were written on topics from geometry, calculus, probability, number theory, game theory, English, Latin, music, photography, cryptography, and psychology. Many of these

students ... in order to achieve desired results were forced to generalize and abstract in a manner which, under ordinary circumstances, they never would have done. Many theoretical concepts were made concrete, seemingly divergent ideas were connected, a logical approach to problem-solving and an analytical way of thinking developed, and a cooperative interaction between students was observed ..."

T. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: The formal program of the first phase of the project was concluded with the end of the 1966-1967 school year. A final report is now in preparation, and may be requested from the project director by interested agencies or individuals.

U. PLANS FOR THE FUTURE: Current phase of project activities will terminate with issuance of final report in February 1968. A proposal for a second phase, which will emphasize a study of the ways in which computer-based instructional techniques can improve instruction in several subject areas, has been filed with the U.S. Office of Education.

A. PROJECT TITLE: UNIVERSITY OF ILLINOIS ARITHMETIC PROJECT (AT EDUCATION DEVELOPMENT CENTER).

B. PROJECT DIRECTOR: David A. Page.

C. PROJECT HEADQUARTERS:
1. Contact: Mrs. Patricia T. Kosinar, Assistant Director, University of Illinois Arithmetic Project, 372 Main Street, Watertown, Massachusetts 02172. Tel. 617-924-2122.
2. Special facilities or activities available for visitor viewing: Project movies, daily classes taught by project teachers in local schools, and meetings of local in-service institutes for teachers when in session.

D. PRINCIPAL PROFESSIONAL STAFF: Jack Churchill, Associate Director and Editor; Patricia T. Kosinar, Assistant Director; staff teachers: Phyllis R. Klein, Lee Osburn, Carol Gray, Francis X. Corcoran; academic resource staff members: Sally Agro, Edward Esty, Marie Lynch.

E. PROJECT SUPPORT:
1. Organizational sponsorships: University of Illinois; Education Development Center.
2. Funding agencies: National Science Foundation; Education Development Center; Ford Foundation; Carnegie Corporation.

F. PROJECT HISTORY:
1. Principal originators: David A. Page and Jack Churchill.
2. Date and place of initiation: 1958; University of Illinois, Urbana, Illinois.
3. Reason for initiation: See Section H.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PURPOSES AND OBJECTIVES: The central theme of the project is that the study of mathematics should be an adventure, requiring and deserving hard work. Children who grasp some of the inherent fascination of real mathematics while they are in elementary school are well on the way to success in further study of mathematics and science. Students who are not to continue a formal study of mathematics deserve a taste of the subject that is at least as appealing. The project is not attempting to develop a systematic curriculum for any grade level, in the view that determining an adequate curriculum is not possible until more alternatives exist to choose among. What is needed are frameworks that provide day-to-day, "here-is-something-to-try" ideas for the classroom. The emphasis is on things that the teacher can begin working with soon. The term "new mathematics" is avoided by the project. More properly, the project seeks novel ways of doing old mathematics--new structures or schemes within which can be found large numbers of inter-related problems revealing significant mathematical ideas. Teachers participating in an institute work a number of sequences of such problems each week to become acquainted with the mathematics, and then begin to make up and try out their own sequences. Throughout its work, the project has found that

improved computational skills usually follow work with its materials. Children will do impressive amounts of computation in order to solve problems that interest them.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: The courses for teachers are based on written lessons, films of classes, discussions, careful correcting of written work with attention to sources of errors, and the inventing and adapting by participating teachers of new materials for classes.

J. ORIENTATIONS OF STATED OBJECTIVES: Content mastery; attitudinal changes.

K. LOCATION OF LIST OF OBJECTIVES: In the project's "General Information."

L. SPECIFIC SUBJECTS, GRADE AND AGE LEVELS: Mathematics, grades kindergarten through 6.

M. DESCRIPTION OF MATERIALS ALREADY PRODUCED:
1. General Information.
2. Ways to Find How Many.
3. Maneuvers on Lattices.
4. A First Grade Sample.
5. Well-Adjusted Trapezoids.
6. Number Lines for the Orbiting Atomic Teacher.
7. Probability.
8. Functions.
9. Book: Number Lines, Functions, and Fundamental Topics.
10. A Sample and Description of Course I.

N. MATERIALS AVAILABLE FREE: Items 1, 4, 5, 6, 7, 8, and 10 are free in small quantities from the project headquarters.

O. MATERIALS PURCHASABLE: Items 2 and 3, $0.20 each in quantities larger than 10, available from project headquarters. Item 9, $3.80 (deduct 20% discount on orders from schools), available from The Macmillan Company, 866 Third Avenue, New York, N.Y. 10022.

P. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

Q. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: Undetermined.

R. PROJECT IMPLEMENTATION: Over the past several years, some 25,000 teachers have received all available materials from the project. Approximately eight hundred have attended intensive in-service institutes of sixteen weeks or more. These institutes have been given in Chelmsford, Concord, Framingham, Newton, Watertown, and Wellesley, Massachusetts, and in Niles, Illinois as well as summer institutes in Urbana, Illinois. In addition, institutes have been given for most of the elementary teachers at the Perkins School for the Blind, Watertown, Massachusetts.
1. Availability of consultants for teachers: The project is able in some circumstances to send staff members to teach demonstration classes and show films to groups interested in

the project or working with project materials.

2. Activities conducted for in-service teaching training: To introduce its materials to teachers, the project is completing the first of a series of in-service courses that can be given without expert mathematical guidance. This course consists of:

a. Written lessons, including exposition and sequences of problems to be worked by the teachers taking the course. Much of this work is classes.

b. Supplementary written materials that suggest extensions of topics for teachers who have begun to work with the ideas in the classroom.

c. Motion pictures of classes of children being taught by a variety of teachers.

d. Detailed guides for correctors and discussion leaders.

Trial editions of this course will be available to a limited number of school systems for use in the fall of 1968.

3. Implementation procedure, seemingly, the most effective: The most effective components of the project's course comprise the following:

a. Doing sequences of problems which have a "plot", and which are also related to mathematics that can be done with classes of children.

b. Watching and discussing filmed examples of the teaching of the materials, both for pedogogical insights and to learn important aspects of the mathematics.

S. PROJECT EVALUATION: Initial evaluation is carried out by direct observation and trial of materials and ideas by the project staff in prototype institutes. Subsequently, classes taught by institute participants are observed. So far, evaluation of all the project's activities has been founded on direct examination by interested observers of the quality of teachers' and childrens' responses to the mathematical content of the project's materials. Children and teachers both must be excited by mathematics that is of basic interest to professional mathematicians in various fields. This interest must carry through to genuine involvement in the subject. When such concern for mathematics is present, the evidence is unmistakable and includes teacher (and parental) enthusiasm, improved performance by conventional yardsticks, student enthusiasm both group and individual. Some teachers testify that this enthusiasm frequently carries into other subjects. In the belief that the minimum need is for improvement of at least such magnitude, the project has not yet attempted more precise evaluation of its materials.

T. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: During the past two years the project has continued developing topics with classes of children, and preparing and revising materials for its course. Numerous institutes for teachers have been given based on these materials. As will be the case with the completed course, recent institutes have been supervised by personnel in the school system administering them.

Discussions and correcting have been conducted using course materials by teachers in the system, with the project's role limited largely to observation.

U. PLANS FOR THE FUTURE: By the fall of 1968 the project intends to issue limited trial editions of Course I in preparation for commercial distribution and to begin work on Course II.

A. PROJECT TITLE: UNIVERSITY OF ILLINOIS COMMITTEE ON SCHOOL MATHEMATICS (UICSM).

B. PROJECT DIRECTOR: Professor Max Beberman, 1210 W. Springfield, Urbana, Ill. 61820. Tel. 217-333-0150.

C. PROJECT HEADQUARTERS:
1. Contact: Max Beberman, Director, UICSM.
2. Special facilities or activities available for visitor viewing: University High School, a secondary school devoted to curriculum development.

D. PRINCIPAL PROFESSIONAL STAFF: Max Beberman, Director; William Golden, Assistant to the Director; Peter Braunfeld, Mathematician; Herbert E. Vaughan, Mathematician; Staven Szabo, Writer; Russell Zwoyer, Writer.

E. PROJECT SUPPORT:
1. Organizational sponsorship: University of Illinois.
2. Funding agencies: Carnegie Corporation of New York (until June, 1962); U.S. Office of Education (until December, 1964); National Science Foundation (1962 -).

F. PROJECT HISTORY:
1. Principal originators: Colleges of Education, Engineering, and Liberal Arts and Sciences of the University of Illinois.
2. Date and place of initiation: December 1951; University of Illinois.
3. Reason for initiation: Dissatisfaction with the mathematics preparation of incoming freshman at the University of Illinois and the desire to guide high schools in improving their mathematics offerings.

G. PRESENT COMMERCIAL AFFILIATIONS: Some texts produced by the UICSM are published by D.C. Heath and Co. Films produced by the UICSM are distributed by Modern Learning Aids, Inc. Seventh and eighth grade texts to be distributed by Harper and Row, Inc. Vector Geometry to be distributed by Macmillan Company.

H. PURPOSES AND OBJECTIVES: Until 1962 the UICSM devoted its efforts to producing a highly self-consistent and inter-related series of texts for college bound students in grades 9-12. These texts are unusual in that they embody "discovery method" pedagogy; they were the first to introduce a strong deductive thread to the teaching of elementary algebra; and they introduce and use principles of logic and a level of precision in language which is not common to high school texts. Since 1962, the major curriculum development effort has been the development of unusual approaches to topics in junior high school mathematics appropriate for culturally disadvantaged students in large urban school systems.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Laboratory investigations, lectures, computer assisted instruction.

J. ORIENTATIONS OF STATED OBJECTIVES: Content mastery, process acquisition, attitudinal changes.

K. LOCATION OF LIST OF OBJECTIVES: For the most part, the objectives are not explicitly stated. Some indication is given in journal articles.

L. SPECIFIC SUBJECTS, GRADE AND AGE LEVELS: The UICSM program for senior grades 9-12: Algebra, plane Euclidean geometry, advanced algebra, and circular functions, with appendices on solid geometry, logic, and other topics; The UICSM Vector geometry course: a two-year sequence in three-dimensional Euclidean geometry, linear algebra, and trigonometry with a vectorial approach--for able students in senior high school; The UICSM 7th grade materials: The arithmetic of common fractions, decimals and per cents using unconventional models and heavy reliance on pictures--for culturally disadvantaged junior high school students with low achievement in mathematics; The UICSM 8th grade materials; plane geometry approached through motions in the plane.

M. DESCRIPTION OF MATERIALS ALREADY PRODUCED:
1. UICSM HIGH SCHOOL MATHEMATICS; UNITS 1-11 (including teachers commentaries).
2. Examinations for Units 1-6.
3. Teacher-training films-demonstrations of a class studying the UICSM 9th grade course.
4. Self-instructional texts on solid geometry, logic, introduction to algebra.

N. MATERIALS AVAILABLE FREE: None available from item listings above. Reprints of articles written by staff available upon request.

O. MATERIALS PURCHASABLE: Item 1, UICSM High School Mathematics, Units 1-11 (individual units); UICSM High School Mathematics, Course 1 (revised Units 1-4); UICSM High School Mathematics, Course 2 (revised Units 6 and 9); UICSM High School Mathematics, Course 3 (revised Units 5, 7, 8, and 9). Available from D.C. Heath and Co., Text distributor. Item 2, available from D.C. Heath and Company. Item 3, available from Modern Learning Aids, Inc. Item 4, available through UICSM Project, 1210 W. Springfield, Urbana.

P. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

Q. LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: Spanish and French.

R. PROJECT IMPLEMENTATION:
1. Number of teachers using materials: Information on number of teachers and students is not available. Much of the materials are commercially distributed, and the publisher keeps all records. Other materials are yet to be published.
2. Name and location of specific schools where course is being taught: Pascack City H.S., Hillsdale, N.J.; Boulder City H.S.,

Boulder City, Nev.; Northridge J.H.S., Los Angeles; Sherwood J.H.S., Memphis, Tenn.; Dole Intermediate School, Honolula; Central H.S., Philadelphia, Pa.

3. Availability of consultants for teachers: Schools who adopt the Junior High School materials will be offered consultative help by the project and the publisher.
4. Activities conducted for in-service teacher training: Several NSF-supported school-college cooperative programs to help teachers of elementary algebra.
5. Implementation procedures in addition to above: Summer 1968, the staff will train 20-30 supervisors who, in turn, can train teachers for UICSM Junior High Program.
6. Implementation procedure, seemingly, the most effective: See R4.
7. How evaluated: Not formally.

S. PROJECT EVALUATION:

1. Evaluation conducted by: Special sub-staff of the project.
2. Instruments used: Standardized tests, original tests, observation by staff, teachers' reports.
3. Control groups: None used.
4. Feedback process: Tests and reports are summarized for presentation to authors.
5. Research evidence of objectives achieved: Some test results are informative.
6. Availability of evidence: Very little is available for distribution. A visit to the project provides opportunity to talk with individuals involved.

T. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: The final revisions of the vector geometry course and 7th and 8th grade courses are nearing completion. Publication arrangements for these materials have been made.

U. PLANS FOR THE FUTURE: New projects, perhaps in computer-based education in mathematics, or in elementary science--mathematics are contemplated for 1968-69.

A. PROJECT TITLE: UNIVERSITY OF MARYLAND MATHEMATICS PROJECT (UMMaP).

B. PROJECT DIRECTOR: Henry H. Walbesser, Director, University of Maryland Mathematics Project, College of Education, University of Maryland, College Park, Maryland 20740. James H. Henkelman, Associate Director. Tel. 301-454-2031.

C. PROJECT HEADQUARTERS:
1. Contact: Director or Associate Director, UMMaP.
2. Special facilities or activities available for visitor viewing: Samples of textbooks prepared, reprints of research reports, pre-service courses for elementary mathematics teachers, and research seminar.

D. PRINCIPAL PROFESSIONAL STAFF: Director and Associate Director; Mildred B. Cole and Robert Ashlock, College of Education, University of Maryland.

E. PROJECT SUPPORT:
1. Organizational sponsorship: None.
2. Funding agencies: U.S. Office of Education support for Maryland Elementary Mathematics In-service Project, research and development activity; National Science Foundation support for Maryland Elementary Mathematics In-service Project elementary teacher training institute.

F. PROJECT HISTORY:
1. Principal originator: John R. Mayor.
2. Date and place of initiation: 1957; University of Maryland.
3. Reason for initiation: To develop experimental courses in mathematics for use in junior high school.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PURPOSES AND OBJECTIVES: The principal purpose of the project is to contribute to the improvement of the teaching of mathematics. The project has produced experimental textbooks for mathematics in junior high school and experimental textbooks for courses in mathematics for elementary teachers. In addition, the project has conducted research studies in the learning of mathematics. Presently the main efforts of the project are directed toward the development of an in-service course for elementary teachers of mathematics which incorporates behavioral objectives and specific evaluation, and the research into mathematics instruction with the use of behavioral hierarchies.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study; programmed instruction; computer assisted instruction; dial access with tape recording and 35 mm projectors.

J. ORIENTATIONS OF STATED OBJECTIVES: Content mastery; process acquisition; attitudinal changes; scientific literacy.

K. LOCATION OF LIST OF OBJECTIVES: In the MEMIP materials, behavioral objectives are stated at the beginning of each lesson. In UMMaP

junior high school texts, there are objectives in the teacher's guide for each chapter.

L. SPECIFIC SUBJECTS, GRADE AND AGE LEVELS: Mathematics, grades seven and eight; preservice elementary teachers; in-service elementary teachers.

M. DESCRIPTION OF MATERIALS ALREADY PRODUCED:

1. Mathematics for the Junior High School: First Book. College Park, Maryland: University of Maryland, College of Education, 1959.
2. Answer Book for item 1.
3. Mathematics for the Junior High School: Second Book. College Park, Maryland: University of Maryland, College of Education, 1961.
4. Teacher's Guide for item 3.
5. Mathematics for Elementary School Teachers. College Park, Maryland, University of Maryland Mathematics Project, College of Education, 1964.
6. Mathematics for Elementary School Teachers: Book II. College Park, Maryland, University of Maryland Mathematics Project, College of Education, 1965.
7. Gagné, Robert M. and Otto C. Bassler. "Study of Retention of Some Topics of Elementary Non-Metric Geometry." Journal of Educational Psychology 54: 123-31; 1963.
8. Gagné, Robert M., John R. Mayor, Helen L. Garstens, and Noel E. Paradise. "Factors in Acquiring Knowledge of a Mathematical Task." Psychological Monographs, 1962, 76, No. 7 (Whole No. 526).
9. Gagné, Robert M. and Noel E. Paradise. "Abilities and Learning Sets in Knowledge Acquisition." Psychological Monographs, 1961, 75, No. 14 (Whole No. 518).
10. Gagné, Robert M. and staff, University of Maryland Mathematics Project. "Some Factors in Learning Non-Metric Geometry." Monograph of Society for Research in Child Development, 1965.
11. Mayor, John R., James H. Henkelman, and Henry H. Walbesser, Jr., "An Implication for Teacher Education of Recent Research in Mathematics Education." Journal of Teacher Education, 16: 483-90; 1965.
12. Maryland Elementary Mathematics Inservice Program, Volume One, Algorithms, 1967. (Sample instructional session available.)
13. University of Maryland Mathematics Project, "Replications of Area and Volume Experiments of Project". Occasional paper of the Bureau of Education Research and Field Service, University of Maryland.

N. MATERIALS AVAILABLE FREE: Items 9, 11, and sample lesson from 12 available from project headquarters.

O. MATERIALS PURCHASABLE: The following are available from the project headquarters: Item 1, $3.25; Item 2, $2.00; Item 3, $3.25; Item 4, $2.00; Item 5, $2.50; Item 6, $2.50; Item 12, $3.75.

P. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

Q. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: None planned at present.

R. PROJECT IMPLEMENTATION:

1. Number of teachers using materials: No records available.
2. Number of students involved: No records available.
3. Number of schools involved: No records available.
4. Name and location of specific schools where course is being taught: Pre-service mathematics courses, University of Maryland; in-service mathematics courses, University of Maryland.
5. Availability of consultants for teachers: The staff is available.
6. Activities conducted for in-service teacher training: Summer institute; in-service institute during academic year.
7. Implementation procedures in addition to above: None.

S. PROJECT EVALUATION:

1. Evaluation conducted by: Director.
2. Instruments used: Evaluative instruments based on the behavioral objectives for the in-service courses in mathematics for teachers in elementary school.
3. Control groups: Not used this year; will begin to include them in summer and during next year.
4. Feedback process: Preliminary editions of in-service course materials are used in several elementary school faculties with feedback provided by evaluative instruments for the behavioral objectives and observation forms.
5. Research evidence of objectives achieved: The basic research evidence collected by MEMIP concerns the acquisition of those behaviors specified by the behavioral objectives. Behavioral objectives were identified and described for materials developed to achieve these objectives; assessment instruments designed for each objective, assessment measures administered.
6. Availability of evidence: Available; report published for Volume One of MEMIP in U.S. Office of Education report to be available September 1968.

T. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: Continuation of in-service elementary mathematics project development; beginning of junior high school mathematics curriculum with reference to job entrance capabilities; continuation of learning hierarchy research.

U. PLANS FOR THE FUTURE: The 1968 work will continue through activities of UMMaP: curriculum development, in-service training, and hierarchy research.

SYNOPSES

The following brief descriptions are of projects being carried on as a regular function of a state department of education. Some of them are well-established and have been described completely in earlier issues of The Clearinghouse Report; others are new and not yet fully established:

1. IDAHO EARTH SCIENCE.
   CONTACT: Sylvia H. Ross, Idaho Earth Science, Groundwater Geologist, Idaho Bureau of Mines and Geology, Moscow, Idaho 83843.

This book discusses Idaho's geology, and is designed as a Supplement to Investigating the Earth (ESCP). It is the first one of a series to be written, and includes such topics as fossils, rock types, mineral and water resources, soils, and climatic patterns.

2. MASSACHUSETTS NASA AEROSPACE CURRICULUM RESOURCE GUIDE.
   CONTACT: John W. Packard, Massachusetts NASA Aerospace Curriculum Resource Guide, Massachusetts Department of Education, 182 Tremont Street, Boston, Massachusetts 02111.

This resource guide provides assistance to teachers in grades K through twelve, in identifying and relating recent advances in aerospace science and technology to many subject matter areas. It is also intended to serve as a prototype for the development of similar materials by other educational agencies.

3. MINNESOTA FIELD AND LABORATORY INVESTIGATIONS IN JUNIOR HIGH SCHOOL SCIENCES.
   CONTACT: Robert E. Collins, Minnesota Field and Laboratory Investigations in Junior High School Sciences, Science Consultant, State Department of Education, Centennial Building, St. Paul, Minnesota 55101.

Two publications, Laboratory Investigations in the Life Sciences and Geologic Field Investigations in Minnesota, were prepared to provide a rich variety of more or less independent field and laboratory investigations in the life and earth sciences. These were distributed to all school districts in Minnesota.

4. NEW HAMPSHIRE MATHEMATICS I AND MATHEMATICS II.
   CONTACT: Fernard J. Prevost, New Hampshire Mathematics I and Mathematics II, Consultant, Math. Education, State Department of Education, State House Annex, Concord, New Hampshire 03301.

This project provides a two course mathematics sequence in grades nine and ten, for non-college bound students. The course materials provide experiences in arithmetic and geometry concurrently with the development of a basic Algebra I background.

5. NEW HAMPSHIRE SCIENCE PROGRAM: GRADES 7 AND 8.

CONTACT: Howard I Wagner, Sr., New Hampshire Science Program: Grades 7 and 8, Consultant, Science Education, New Hampshire State Department of Education, State House Annex, Concord, New Hampshire 03301.

A single volume, containing sections in biology, chemistry, earth science, and physics for grades seven and eight, is being prepared. It will provide a process-oriented program for science which utilizes content and activities relevant to junior high youth. It is keyed to the seasonal characteristics and the natural features of New Hampshire.

6. NEW YORK STATE EDUCATION DEPARTMENT.

CONTACT: Gordon E. Van Hooft, New York State Education Department, Albany, New York 12224.

In addition to booklets listed in previous Clearinghouse Reports, the following have been produced:

1. Mathematics 7-8 (Syllabus 1967).
2. Science 7-8-9, Block G, Living in the Space Age 1967.
3. Science 7-8-9, Block H, Weather and Climate 1967.
4. Science 7-8-9, Block I, Forces at Work 1966.
5. Science 7-8-9, Block K, Energy at Work 1967.
6. Experimental Biology Syllabus, 1967 edition.
7. Physics Syllabus, 1966.
8. Tips and Techniques for Elementary Science, 1966.
9. Air Pollution, 1966.
10. Water Pollution, 1967.

An Earth and Space Syllabus revision is in preparation for publication in the fall of 1968.

7. PENNSYLVANIA CONSERVATION AND OUTDOOR EDUCATION CONTINUUM.

CONTACT: Mrs. Eleanor Bennett, Pennsylvania Conservation and Outdoor Education Continuum, Bureau of General and Academic Education, Department of Public Instruction, Box 911, Harrisburg, Pennsylvania 17126.

This is a continuous program concerned with developing state-wide programs in conservation and outdoor education in the schools and teacher training institutions.

A state advisory committee advises and assists in developing guidelines for a state-wide program for elementary, secondary schools and colleges. The program includes working with counties and local school districts in the development of instructional programs and outdoor laboratories in the elementary and secondary schools; working with colleges and universities in planning courses, summer workshops and outdoor education facilities; assisting in establishing pilot programs under Title III; making bibliographical materials available; in cooperation with the Research Bureau making a study of the current status of conservation and outdoor education in the schools of the Commonwealth; and promoting and encouraging the expansion and establishment of programs and services in conservation and outdoor education by cooperating with allied agencies. A

conservation guide, containing activities for integration into K-12 subject areas, has been published.

8. THE PENNSYLVANIA EARTH AND SPACE SCIENCE IMPROVEMENT PROGRAM.
CONTACT: William H. Bolles or Joseph E. Anthony, The Pennsylvania Earth and Space Science Improvement Program, Department of Public Instruction, Bureau of General and Academic Education, Box 911, Harrisburg, Pennsylvania 17126.

An elementary and a secondary earth and space teaching guide were developed as resource material from which individual schools can develop earth and space science curriculum suited to their own needs. These publications were distributed to all schools in the state. They are to be revised by June of 1969. In-service workshops are held to increase the effectiveness of instruction by the process of improved teacher competency.

9. PENNSYLVANIA SCIENCE IN ACTION PROGRAM.
CONTACT: Joseph E. Anthony, Pennsylvania Science In Action Program, Department of Public Instruction, Bureau of General and Academic Education, Box 911, Harrisburg, Pennsylvania 17126.

A series of sixteen booklets, to be used as resource material for local districts, has been prepared to provide direction and assistance in establishing laboratory science learning activities and newer mathematical methods in grades K through nine. One new booklet, Basic Electricity, has been added this year, and more are planned. Summer workshop and followup activities are being carried out.

10. SCIENCE FOR GEORGIA SCHOOLS - JUNIOR HIGH SCHOOL.
CONTACT: Science Coordinator, Science for Georgia Schools - Junior High School, State Department of Education, State Office Building, Atlanta, Georgia 30034.

Three curriculum guides, Life Science, Physical Science and Earth Science, were begun by a summer writing team in 1967. Dr. J.J. Westfall, of the University of Georgia is continuing the preparation. When finished, the guides will be similar to other state science guides for this level.

11. WISCONSIN MATHEMATICS CURRICULUM PUBLICATIONS.
CONTACT: George L. Henderson, Wisconsin Mathematics Curriculum Publications, Department of Public Instruction, 126 Langdon Street, Madison, Wisconsin 53702.

Curriculum bulletins for Wisconsin schools are provided for grades K to twelve. The K-6 guide is complete and is being tested. The others will follow in 1969 (7-8) and 1970 (9-12). Each bulletin is organized in terms of specific behavioral objectives.

The following synopses represent completed projects or projects in the preliminary stages of development in various localities throughout the United States or projects which do not involve curriculum development but which will be of interest to persons concerned with curriculum.

12. ARLINGTON COUNTY K-12 CURRICULUM DEVELOPMENT PROJECT.
CONTACT: Dr. Harold M. Wilson, Arlington County K-12 Curriculum Development Project, Associate Superintendent for Instruction, 4751 N. 25th St., Arlington, Virginia 22207.

This project to develop and implement an articulated K-12 science program has among its purposes: To relate science concepts with and to specific experiences; to provide extensive laboratory experiences; to develop methods of presentation effective in teaching the "slow learner"; to develop a continuous in-service program for teachers of all grades; and to provide funds and time for continuous revision of program.

Materials have been prepared for elementary, junior high and senior high courses. A summary writing conference is to be held each summer with testing and evaluation to be conducted during the school year. An expansion of the outdoor education program is being developed and a K-12 planetarium curriculum is planned.

13. CALIFORNIA MATHEMATICS IMPROVEMENT PROGRAMS (MIP).
CONTACT: Mrs. Bryne Bessie Frank, MIP, Bureau of Elementary and Secondary Education, 721 Capital Mall, Sacramento, California 95814.

The California State Legislature passed legislation to implement a project to assist the public schools of California to improve mathematics education. There are four programs:

1. Test Development: a new test to be developed to measure the degree to which California's revised mathematics program is being met (rather than to assess individual pupil achievement). Forms will be developed for grades 3, 6, and 8.
2. Three Pilot Research Programs: (a) and (b) are to be set up to investigate the use of specialists in mathematics at the elementary grades; programs are to run three years, in grades 2 and 5 the first year of 1968-69 and picking up grades 3 and 6 the next two years.

Descriptive information and guidelines for each of the four programs are available from the Department of Education.

14. CATALOGING IDAHO'S NATURAL RESOURCES.
CONTACT: Mrs. Donna L. Parsons, Director, Cataloging Idaho's Natural Resources, 815 Cleveland, Caldwell, Idaho 83605. Tel. 459-1608.

This project will attempt to gather and catalog available information regarding the natural resources of the state of Idaho. The purpose is to make available to all teachers (grades 1-12) a detailed list, by subject and by geographic area, of resources that can be used to teach children science. It is

hoped that teachers will find it easier to include more physical features and biological specimens in the science curriculum.

15. CENTER FOR RESEARCH IN COLLEGE INSTRUCTION OF SCIENCE AND MATHEMATICS (CRICISAM).

CONTACT: Dr. Guenter Schwarz, CRICISAM, 212 Diffenbaugh, Florida State University, Tallahassee, Florida 32306. Tel. 904-559-4166.

The goals of the Center are "To provide a Center for the investigation, development, and dissemination of new materials and techniques of collegiate instruction in the various fields of science and mathematics with emphasis on interdisciplinary co-operation. This Center will provide an agency for bringing the creative efforts of the entire scientific community to the service of curriculum and course development. The undivided attention of individuals for limited periods would be devoted to research on collegiate instruction in science and mathematics."

These were the words of the Interim Organizing Committee describing the goals of the Center. Since then, a number of projects have been initiated, and a broadening of the goals has been achieved.

To the best of the staff's knowledge, this is the first and only inter-university and inter-state regional "Science Teaching Center". In spite of the financial straightjacket which has been put on the operations due to the general funding crisis it is felt that the Center can serve a unique purpose and do it well. Already, several projects have been originated as a result of CRICISAM either at the location of the CRICISAM office or in other locations, which promise to have real impact on curriculum and/or dissemination and/or improvement of instruction in colleges which need help desparately.

The Center has been producing single-concept film loops, new laboratory experiments and has experimented with computer-assisted instruction in mathematics. Plans for the future include developing a physical chemistry laboratory. A list of films produced, prototypes of experiments and a brochure describing their activities is available free from the project director.

16. COLLEGE CURRICULUM DEVELOPMENT PROJECT; CURRICULUM RESOURCES GROUP (CRG).

CONTACT: Mr. Conrad Snowden, CRG, Institute for Services to Education, 55 Chapel Street, Newton, Massachusetts 02160.

This is a research and development project, initiated in the summer of 1967, to determine if a new curriculum in the first and second year can overcome more successfully than the present conventional program the major educational deficiencies of the student population in 13 predominantly Negro colleges. The Curriculum Resources Group is working closely with 100 teachers from the participating colleges in the preparation and trial of new materials and new pedagogical approaches in English, mathematics, social sciences and natural sciences. An evaluation study is an intrinsic part of the program. Curriculum materials are not yet available.

17. A COMPUTER-ASSISTED INSTRUCTION LABORATORY IN MATHEMATICS AND SCIENCE.

CONTACT: Mr. Fred O'Neal, A Computer-Assisted Instruction Laboratory in Mathematics and Science, Bingham Junior High, 7618 Wyandotte, Kansas City, Missouri 64114. Tel. 816-EM3-4482.

This project will investigate the uses, techniques and procedures of computer-assisted instruction in mathematics and science at the eighth grade level. The staff will prepare supplementary and enrichment materials and will conduct in-service teacher training activities in conjunction with the University of Missouri at Kansas City. The materials and facilities will be prepared in 1968 with pilot operation scheduled for 1969. An evaluation procedure will be established as the project progresses.

18. CONCEPTUAL SCHEMES IN SCIENCE: A BASIS FOR CURRICULUM DEVELOPMENT.

CONTACT: Dr. Albert F. Eiss, Conceptual Schemes in Science: A Basis for Curriculum Development, Associate Executive Secretary, National Science Teachers Association, 1201 Sixteenth Street, N.W., Washington, D.C. 20036.

This project is for the purpose of analyzing and expanding the statements of Conceptual Schemes which are outlined in the NSTA publication, Theory Into Action in Science Curriculum Development.

Preparation is being made of some examples of ways in which pupil activities, devised or re-oriented, may be treated so as to make maximum contribution to a better understanding of the conceptual schemes and greater facility in the process of science.

It is planned to complete the project in the spring of 1968 and to publish the materials by the fall of 1968.

19. CONSERVATION CURRICULUM IMPROVEMENT PROJECT (CCIP).

CONTACT: Albert H.H. Dorsey, CCIP, Room 9, School of Education, University of South Carolina, Columbia, South Carolina 29201.

Teacher's guides have been developed and revised for grades one to twelve. The guides attempt to include concepts of conservation as an integral part of subject material units. It is hoped that this instrument will help to develop an action program which will unite public schools, natural resource agencies, and other interested groups in a combined effort to establish better conservation practices in South Carolina. The project will publish the materials in the fall of 1968, and the state department of education will establish a staff position in July of 1968 to develop and supervise a program for use of the materials.

20. ELEMENTARY SCIENCE PROJECT.

CONTACT: Mrs. Barbara Ragle, Project Supervisor, Elementary Science Project, Norwich School, Norwich, Vermont 05055. Tel. 649-1510.

This project was begun to introduce some of the new science curriculum materials into a small school system and to incorporate them into a flexible but cohesive curriculum. Also, a model for

teacher training aimed at meaningful implementation of the new materials is to be built. Interim reports have been issued describing activities in teacher training, selected units, and evaluation. They are available from project headquarters.

21. AN EVALUATION OF THE IMPLEMENTATION OF NEW SCIENCE CURRICULA AND COURSE IMPROVEMENT MATERIALS.

CONTACT: Dr. Sylvia M. Obradovic, An Evaluation of the Implementation of New Science Curricula and Course Improvement Materials, Far West Laboratory for Educational Research and Development, 1 Garden Circle Hotel Claremont, Berkeley, California 94705. Tel. 415-841-9710, ext. 43.

This project was initiated to investigate the factors which contribute to the significant lag between the development of new curricular materials and their adoption in the schools. The first phase entails an investigation of the status of new science curricula in the schools of California and Nevada. The project will investigate problem areas in implementation as seen by different teacher and student subgroups. They will gather data (a) to estimate suitability and adaptability of materials from specific curricula for diverse student groups; (b) to indicate responses made by different ability and achievement student groups; (c) to specify teachers' views on strengths and weaknesses of the curricula and (d) to delineate the recommendations of teachers and principals for improved transition and articulation. Finally, the project aims to conduct an in-depth evaluation of a selected new science curriculum with respect to problems of transition, articulation, and adaptability within the framework of existing science programs in schools of various characteristics serving diverse student populations. A brochure, "Implementing New Science Curricula," briefly indicating the expected outcomes, is available free from the project director.

22. AN EXPERIMENTAL INTERDISCIPLINARY INTRODUCTORY SCIENCE COURSE.

CONTACT: Dr. Gordon G. Evans, Interdisciplinary Introductory Science Course, Department of Chemistry, Tufts University, Medford, Massachusetts 02155. Tel. 617-628-5000, ext. 255.

This is a four-semester course, each semester of which is the equivalent of two ordinary college courses. It prepares students to enter a major program in physics, chemistry, or biology at the junior level, and incorporates the mathematics necessary to support introductory physics and chemistry.

The aims of the course are (1) to produce science students with rich backgrounds in sciences other than their major field; (2) to reduce duplication and inconsistencies which arise in separate courses; (3) to allow coverage of interdisciplinary topics. No materials have been published for general distribution; the project staff has devised a number of new laboratory experiments. A proposal has been submitted to the Office of Education to fund a formal evaluation of the project's achievement.

23. FIELD TEST OF "NEW" CURRICULAR MATERIALS IN ELEMENTARY SCHOOL SCIENCE IN THE PUBLIC SCHOOLS OF NEW YORK CITY.
CONTACT: Dr. Morsley Giddings, Field Test of "New" Curricular Materials, 452 Riverside Drive, New York, New York 10027. Tel. 212-866-4254.

This program, sponsored by the Center for Urban Education, will examine the acquisition of the processes of science by urban children in the elementary grades. No materials have been produced yet. Instruction will include the use of laboratory investigations and lectures, and will begin in the second grade.

24. FREDERICK COUNTY QUALITY IMPROVEMENT PROGRAM FOR MATHEMATICS.
CONTACT: Miss Louise Weagley, Frederick County Quality Improvement Program for Mathematics, Frederick County Board of Education, 115 East Church Street, Frederick, Maryland 21701.

The purpose of this project is to behaviorally describe and sequence a portion of the mathematics curriculum in order to provide a model for possible future curriculum development. The writing of grade five mathematics is underway. The testing will follow and the model should be complete by May 1968.

25. FUTURE-ORIENTED CURRICULUM - UNION SCHOOLS (FOCUS).
CONTACT: Mr. Paul A. Jennings, FOCUS, Union School District, 5175 Union Avenue, San Jose, California 95124. Tel. 408-377-8010.

This program attempts to implement, evaluate and refine a K-6 elementary curriculum which, by incorporating student performance objectives in a process-centered curriculum, will develop in children creative faculties with a capacity for openness, inquiry, and independent learning. It will cover all subject areas. A list of student objectives, reflecting a process-centered curriculum, is available upon request, as well as a management and control model. Basic research on many classroom variables will be conducted during the project.

26. IDENTIFYING BEHAVIORAL OBJECTIVES FOR SCIENTIFIC LITERACY.
CONTACT: Dr. Albert F. Eiss, Identifying Behavioral Objectives for Scientific Literacy, Associate Executive Secretary, National Science Teachers Association, 1201 Sixteenth Street, N.W., Washington, D.C. 20036.

This project is an attempt to begin the task of identifying behavior descriptions which are appropriate for use in evaluating the development of desirable attitudes, interests, and appreciations for the scientifically literate citizen. A list of subject matter topics that are essential for scientific literacy is also being prepared. A preliminary report of these activities is available from the director. An overhead transparency-taped sound sequence, "Why Behavioral Objectives?" was prepared to introduce the topic to participants at the nine regional meetings held in the fall of 1967. This sequence is available from N.S.T.A. at a cost of $25.00.

27. INQUIRY DEVELOPMENT IN BIOLOGICAL SCIENCES CURRICULUM STUDY.
CONTACT: Dr. Willard G. Jones, Inquiry Development in Biological Sciences Curriculum Study, Associate Director for Programs, BSCS, Mid-Continent Regional Educational Laboratory, 104 East Independence Avenue, Kansas City, Missouri 64106.

The results of this project, started in February 1968, will be available through ERIC in the summer of 1969. Its purpose is to facilitate investigation and develop programs which influence school personnel in ways which nurture pupils' development toward self-directed inquiry. The first materials produced are pilot-model behavioral objectives for pupils and teachers.

28. AN INSTRUCTIONAL SYSTEMS APPROACH TO PHYSICAL AND EARTH SCIENCES.
CONTACT: Mr. Robert A. Bair, An Instructional Systems Approach to Physical and Earth Sciences, Title III Science Project, Kings County Superintendent of Schools Office, 1144 West Lacey Boulevard, Hanford, California 93230.

The current objective of this project is to determine the instructional goals for a terminal course in physical science at the high school level, to translate them into behavioral objectives and to devise learning experiences to achieve these behaviors. The course will then be implemented and evaluated. The methods of instructions to be used are independent study, laboratory investigations and discussion groups. No materials have been produced yet. A report on the project will be available in July from the director.

29. INTRODUCTORY CHEMISTRY AND PHYSICS: A COMBINED FIRST YEAR COURSE FOR SCIENCE MAJORS.
CONTACT: Prof. Rosalie Hoyt, Introductory Chemistry and Physics, Department of Physics, Bryn Mawr College, Bryn Mawr, Pennsylvania 19010. Tel. 215-LA5-1000.

This course attempts to teach introductory chemistry and physics more efficiently and more effectively by combining and integrating the two courses. The course is taught jointly by a member of each department concerned. Successful completion qualifies students to do intermediate work in either discipline. No calculus is required for entrance, and calculus concepts are introduced as needed. Topics selected are treated to show the intimate relation between chemistry and physics. The preliminary text edition has been revised and is available from Edwards Bros., Ann Arbor, Michigan. A report describing the course in detail is available from project headquarters.

30. PACIFIC NORTHWEST ASSOCIATION FOR COLLEGE PHYSICS (PNACP).
CONTACT: Mr. Wilbur V. Johnson, Executive Officer, PNACP, Department of Physics, University of Washington, Seattle, Washington 98105. Tel. 206-543-2771.

This association was begun to attempt to solve the problems, which were created by the concentration of trained faculty and funds

in major graduate centers, encountered by colleges in the Pacific Northwest area. The purposes of the Association are to increase communication among area college physics teachers, to promote beneficial programs, to sponsor and support conferences on problems of physics teaching, to support leaves-of-absence and grants-in-aid, to provide assistance in recruitment of new faculty and to assist with preparation of proposals for government or foundation funding. The Association publishes a monthly newsletter which is free on request from headquarters. This summer they will sponsor a summer institute for community-college instructors; this is the first of a four-summer sequence leading to the master's degree.

31. PROBLEM SOLVING PROJECT.

CONTACT: Dr. Howard Sullivan, Problem Solving Project, Southwest Regional Laboratory, 11300 La Cienega Boulevard, Inglewood, California 90403. Tel. 213-776-3800.

This project funded by the U.S. Office of Education, has as its main objective to teach problem-solving behaviors to elementary school children. At the moment, the staff is working at the kindergarten level; no materials are available for general release. Specific plans for implementation are not yet formulated, but the procedures will stress process acquisition by elementary students working in group activities.

32. PROGRAMMED GEOLOGY LABORATORY.

CONTACT: Dr. W.C. Sweet, Programmed Geology Laboratory, Department of Geology, Ohio State University, Columbus, Ohio 43210. Tel. 614-293-2326.

This project attempts to provide an integrated series of laboratory experiences for students in introductory geology with a broad background of previous training. Laboratories will be individual, with demonstrations on sound film and 35 mm slides, and supplemented by specimens, maps and a programmed laboratory manual that includes both pre-lab and post-lab sections. Both a physical and a historical approach will be taken in this course aimed at freshmen in college. A pilot run of the materials is scheduled for October of 1968.

33. PSSC COLLEGE PHYSICS.

CONTACT: Miss G. Kline, PSSC College Physics, Education Development Center, 55 Chapel Street, Newton, Massachusetts 02160.

PSSC College Physics is based on and incorporates much of PSSC Physics, Second Edition. Although a large fraction of college students who elect to major in science have studied the second edition, only a small fraction of students who enter college have had any course in physics. PSSC College Physics is an excellent choice for these students.

Features:

1. Only three chapters of Part I of PSSC Physics, Second Edition

have been used. These were revised and used in a new sequence. Several new chapters were written. Most of Parts II, III and IV of the Second Edition were used with appropriate revision.

2. The Advanced Topics have been incorporated, with a few changes, in appropriate places.

3. Some new questions and problems have been provided. The book contains more than 800 end-of-chapter questions and problems. Answers to short problems are given in a section at the back of the book.

4. A Laboratory Guide contains sixty-one experiments ranging from mechanics to atomic energy levels. These experiments are largely open-ended. Most of them are identical to experiments in the Second Edition and in the Advanced Topics.

5. Apparatus for the experiments is available from Raytheon Education Company.

6. An Instructor's Guide (brand new and supplied gratis) provides answers to those problems not answered in the text; provides suggestions to the instructor for conducting the experiments, including required apparatus; and provides other useful information, including a correlation with the PSSC films.

34. REGIONAL ACADEMIC MARINE PROGRAM (RAMP).
CONTACT: Mr. Sebastian J. Cultrera, RAMP, Kittery, Maine 03904. Tel. 207-439-3644.

The prime objective of RAMP is to extend a gradually-expanded program of marine education for grades 1-12. The staff will conduct a rotating series of classes and will offer laboratory and demonstration experiments related to the classroom work in the schools. Special plans have been made for teaching oceanology at grades six to nine with emphasis on laboratory and field experiences. Writing and implementation of the units in marine sciences will be completed by 1970 as well as cooperative in-service programs to train teachers.

35. SCIENCE CENTER PROJECT.
CONTACT: Mrs. Nell R. Croley, Science Center Project, The Science Center, 7701-22nd Avenue, N., St. Petersburg, Florida 33710. Tel. 342-8691.

This project is planned to provide a center for voluntary self-education for scientifically inclined students in Pinellas County. The facilities are made available to students for both individual research and group learning situations. The Center tries to improve the scientific and technical level of study and investigation by the provision of personnel, equipment and materials necessary for research in the physical and biological sciences. The Center staff has produced guidebooks for school and carrying out projects.

The center is staffed by six paid and forty volunteer people. Last year it served 1,352 students.

36. SCIENCE CENTER OF RESEARCH AND EVALUATION (SCORE).
CONTACT: Pocahontas S. Duffey, SCORE, Richland County School District No. 2, 6831 Brookfield Road, Columbia, South Carolina 29206. Tel. 803-782-6500.

This project proposes to develop and implement a science program based on the conceptual approach to teaching for three ability levels (low, average, and above average) for grades 1-8. Also, it will identify the degree of complexity of each concept introduced at each level to help determine science training needed for elementary teachers. The project will deal with life science and earth science.

All elementary and junior high school teachers in the school district are expected to use the materials which are being developed and are to be available in the summer of 1968.

37. SCIENCE CURRICULUM PROGRAM: IMPLEMENTATION OF SCIENCE--A PROCESS APPROACH.
CONTACT: Dr. Richard W. Ford, SAPA, Eastern Regional Institute for Education, 635 James Street, Syracuse, New York 13203. Tel. 315-474-5321.

This project was begun to develop systems for implementation, monitoring and adoption of innovation curricula. The strategies to be followed are: (1) identify, describe, and evaluate Science--A Process Approach with data collected from teachers, administrators, and ERIE staff; (2) specify the necessary auxiliary instructional materials and the alternative teaching procedures; (3) observe and record specified teaching behaviors and student-teacher interactions; (4) assess student performance; (5) assess the effect of the new program on the prevailing organizational and instructional climate; (6) contrast ERIE's efforts with other school districts that have installed Science--A Process Approach independently. The first "manual" for implementation is scheduled for the summer of 1968.

38. WORTH CURRICULUM DEVELOPMENT CENTER AND SERVICES.
CONTACT: Mr. Frank Pool, Worth Curriculum Development Center, 12225 South Crawford, Alsip, Illinois 60658. Tel. 312-385-1220.

This project attempts to develop curriculum guides and to serve as center for instructional materials; it serves all public and parochial schools within the Eisenhower-Richards High School District. Curriculum guides for science (K-9) have been produced and are being pilot tested (1967-1968). Materials are not yet ready for distribution.

The College Commissions of the United States

A. NAME OF COMMISSION: ADVISORY COUNCIL ON COLLEGE CHEMISTRY (AC_3 OR ACCC).

B. CHAIRMAN OF COMMISSION: Dr. L. Carroll King, Department of Chemistry, Northwestern University, Evanston, Illinois 60201. Tel. 312-492-3548.

C. DIRECTOR OR EXECUTIVE SECRETARY:
1. Contact: Dr. Gordon M. Barrow, Executive Director, Advisory Council on College Chemistry, Department of Chemistry, Stanford University, Stanford, California 94305. Tel. 415-321-2300, ext. 2807.

D. PRINCIPAL PROFESSIONAL STAFF: D.N. Marquardt, Staff Associate, 1/15/68 - 9/15/68; Rod O'Connor, Staff Associate, 9/1/67 - 8/31/68.

E. PROJECT SUPPORT:
1. Organizational sponsorship: (Not answered).
2. Funding agency: National Science Foundation.

F. COMMISSION HISTORY:
1. Principal originators: Ad hoc committee called together by NSF consisting of A.C. Cope, L.C. King, C.C. Price, P.E. Yankwich, augmented by E.L. Haenisch, J.A. Young.
2. Date and place of initiation: October, 1961; Washington, D.C.
3. Reason for initiation: To stimulate and provide coordination among a number of independent efforts to improve undergraduate instruction in chemistry and to facilitate communication of the importance of good teaching and good teaching ideas in this field.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PURPOSES AND OBJECTIVES: "Not to operate or dictate but to disseminate information and to stimulate action."

I. PROJECTS NOW UNDERWAY: Curriculum and Advanced Courses, D.N. Hume, MIT; Freshman Chemistry, H.B. Gray, California Institute of Technology; Science for Non-majors, F.I. Bonner, SUNY, Stony Brook; Teaching Aids, H.V. Malmstadt, University of Illinois; Teacher Development, R.C. Brasted, University of Minnesota; Two-Year College, W.T. Mooney, Jr., El Camino College; Liberal Arts, R.I. Walter, Haverford College; Mathematics Preparation, W.H. Eberhardt, Georgia Tech; U.S.-Japan Cooperation, G.M. Barrow; Computer Animation, C.E. Rodriguez, Science Teacher Center, MIT; Resource Papers, R.W. Parry, University of Michigan; Regional Conferences, D.N. Marquardt, AC_3; Consultant Service, M.M. Renfrew, University of Idaho; Publications, W.H. Eberhardt, Georgia Tech.

J. DESCRIPTION OF MATERIALS ALREADY PRODUCED:
1. Newsletter 1, June 1963.
2. Resource Paper I: "Ligand Field Theory" F.A. Cotton,

reprinted from Sept. 1964 Journal of Chemical Education, 11 pages.
3. "Thermochemical Investigations for a First-Year College Chemistry Course," Neidig, Schneider, and Teates, reprinted from January 1965 Journal of Chemical Education, 6 pages.
4. Resource Paper II: "Elementary Chemical Thermodynamics," L.K. Nash, reprinted from Feb. 1965 Journal of Chemical Education, 12 pages.
5. Resource Paper III: "Bond Energies," S.W. Benson, reprinted from Sept. 1965 Journal of Chemical Education, 17 pages.
6. "Modern Experiments for Introductory College Chemistry," reprinted from Sept. 1965 Journal of Chemical Education, 32 pages.
7. "Guidelines and Suggested Title List for Undergraduate Chemistry Libraries," 44 pages, April 1966.
8. Resource Paper IV: "Isoelectronic Systems," Henry A. Bent, reprinted from April 1966 Journal of Chemical Education, 15 pages.
9. Resource Paper V: "Atomic Orbitals," R. Stephen Barry, reprinted from June 1966 Journal of Chemical Education, 15 pages.
10. Newsletter 6, November 1966, Lab's Love's Labors Lost?
11. Report: "Modern Teaching Aids for College Chemistry," 46 pages January 1967.
12. Report: "Problems in Two-Year College Chemistry," 6 pages March 1967.
13. Report: "Supplement to Problems in Two-Year College Chemistry," 72 pages, April 1967.
14. Newsletter 8, March 1967, The San Clemente Conference on Chemical Dynamics.
15. Resource Paper VI: "Biochemistry in the Introductory Chemistry Course," Julian M. Sturtevant, reprinted from April 1967 Journal of Chemical Education, 7 pages.
16. Resource Paper VII: "Combustion and Flame," Robbin C. Anderson, reprinted from May 1967 Journal of Chemical Education, 13 pages.
17. Newsletter 9, May 1967, Report on the Conference on Biochemistry.
18. Report: "Textbook Errors Index," Van Meter and Eberhardt, reprinted from June 1967 Journal of Chemical Education, 6 pages.
19. Report: "The Undergraduate Mathematics Program of Students in Chemistry," 9 pages, June 1967.
20. Revised, "Modern Experiments for Introductory College Chemistry" Published by the Journal of Chemical Education, $2.50, p.116. Orders should be sent to: Chemical Education Publishing Co., 20th and Northampton Streets, Easton, Penn. 18042.
21. Newsletter 10, August 1967, "Teaching Aids Programs".
22. Report: "The Status of Biochemistry in Chemistry Departments" 17 pages, September 1967.
23. Newsletter 11, October 1967, "The AC_3 Consultant Service".
24. Booklet: "Teacher-Produced Instructional Films in

Chemistry" January 1968.
25. Report of the Conference on "Alternatives and Supplements to the Introductory Laboratory," Washington, D.C., January 20-21, 1966.
26. Report of the Regional Conference at Texas A & M University, November 18-19, 1966, "Recent Trends in General Chemistry."
27. Report of the Regional Conference at Florida State University, February 24-25, 1967, "Chemistry for General Education" and "The Balance of Theory and Description in General Chemistry".
28. Case Histories - Chemistry in Courses for Non-Science Majors.
    a. Chem. 108. University of Wisconsin by E.M. Larsen.
    b. A New Approach. Antioch College by James F. Corwin, R.C. Anderson, February 1967.
29. A bibliography on the subject: Laboratory vs. Demonstration.
    a. Excerpts about "The General Chemistry Laboratory Problem" from AC_3 publication number 3.
    b. Some Journal of Chemical Education References Pertaining to Laboratory Demonstration Instruction.
30. Newsletter 7, January 1967, Chemistry for Non-Science Majors.

Reprints Available through AC_3:
31. R.I. Walter "The Changing Curriculum in Chemistry:"
    a. "Some Contemporary Developments" J. Chem. Ed. 42, 524-528 (1965).
    b. "Freshman Motivation and Placement in Large Universities" J. Chem. Ed. 43, 499-500 (1966).
    c. "New Curricular Features in Some Liberal Arts Colleges," J. Chem. Ed. 43, 261-562 (1966).
    d. "New Course Plans Based upon a Revised Schedule for the College Year," J. Chem. Ed. 43, 112-115 (1966).
32. Eric Hutchinson "Science: A Component of Liberal Education," Chemistry 39, 4 (1966).
33. O.T. Benfey "Is Science as Important as Bach?" Chemistry 39, 4 (1966).
34. Chemical and Engineering News Reports.
    a. "Antioch Freshmen Educate Themselves." Jan. 31, 1966.
    b. "Nonscience Majors' Chemistry Courses Vary." July 25, 1966.
    c. "AC_3 Zeros in on Chemical Education." August 1, 1966.

Film Loops:
35. Titration Curves.
36. Atomic and Bonding Orbitals (II).
37. Temperature and the Boltzmann Distribution.
38. Gas Reactions (UNESCO Loop 4).
39. Infrared Spectroscopy II.
40. Crystal Structure of metals (XII).
41. Computer Motion Ten Balls.
42. Acid Base Indicators.
43. Molecular Motions in Gases.

44. Molecular Vibrations (Using Models).
45. Alkali Metal Reactions with Chlorine and with Water.
46. Ion Exchange.
47. A Problem in Diffraction.
48. Titration (II).
49. Titration (III).
50. The Automatic Balance Sartorius 2400.
51. The Phase Diagram for Bi-Cd Alloy.
52. An Organic Mechanism.
53. Absolute Zero.
54. Automatic Titrations (Part I).
55. Automatic Titrations (Part II).
56. Molecular Motion in Condensed Phases.
57. Gas Pressure.
58. Gas Effusion.
59. Computer Motion One Ball.
60. Molecular Spectroscopy.
61. Cu-Ag^+ (Copper-Silver Cell).
62. H_2-Ag^+ (Hydrogen-Silver Cell).
63. Electrochemical Cells (Animated).
64. Famous Diamonds.
65. Minerals and Ores.
66. The Single-Pan Balance (Mettler II).
67. Crystal Structure of Metals.
68. Crystal Structure of Metals.
69. Crystal Structure of Metals.
70. Velocity Distribution of Atoms in a Beam.
71. Polymer Science (Parts 1-4).
72. Polymer Science (Parts 1-4).
73. Polymer Science (Parts 1-4).
74. Particle in a Finite-One Dimensional Well.
75. Precision Sample Weighing on a Single Pan Balance (Mettler I).
76. Titration (I).
77. Crystal Structure of Metals (I).
78. Atomic and Bonding Orbitals (I).
79. Infrared Spectroscopy (I).
80. Chemical Families (Alkali Metal Reactions with Chlorine and with water).

K. MATERIALS AVAILABLE FREE: Items 1-33 available from AC$_3$ Publications Office, 701 Welch Rd., Suite 1124, Palo Alto, Calif. 94304. Items 34-79 available ON LOAN from same address.

L. MATERIALS PURCHASABLE: None.

M. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

N. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: No such plans.

O. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: Regularly reported in newsletters and publications.

P. PLANS FOR THE FUTURE: Reported in regular newsletter.

A. NAME OF COMMISSION: COMMISSION ON COLLEGE GEOGRAPHY (CCG).

B. CHAIRMAN OF COMMISSION: Dr. Edward B. Espenshade, Jr., Chairman, Geography Department, Northwestern University, Evanston, Illinois 60201. Tel. 312-492-7301.

C. DIRECTOR OR EXECUTIVE SECRETARY:
Contact: Dr. John F. Lounsbury, Commission on College Geography, Eastern Michigan University, Ypsilanti, Michigan 48197. Tel. 313-483-6100, ext. 2092.

D. PRINCIPAL PROFESSIONAL STAFF: John F. Lounsbury, Project Director; Richard D. Hecock, Assistant Project Director; Mrs. Jeanne O. Pritchard, Project Secretary; Mrs. Betzy M. Shaw, Project Bookkeeper.

E. PROJECT SUPPORT:
1. Organizational sponsorship: Association of American Geographers.
2. Funding agency: National Science Foundation.

F. COMMISSION HISTORY:
1. Principal originators: Dr. John F. Lounsbury and Dr. Saul B. Cohen.
2. Date and place of initiation: January 1965; The Association of American Geographers.
3. Reason for initiation: To improve courses and programs in college geography.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PURPOSES AND OBJECTIVES: To develop approaches to integrate geographic education within the broader higher educational context, including contacts with related disciplines and participation in interdisciplinary curriculum efforts; develop and publish pertinent materials such as resource papers and an annotated list of significant core materials to be distributed to departments and libraries; advise individuals and institutions in strengthening geography curricula; investigate ways and means to increase the effectiveness of undergraduate teaching, including the development of new instructional patterns; and generate, discuss and develop new schemes to improve geographic education in undergraduate programs.

I. PROJECTS NOW UNDERWAY: The full commission serves as the Panel on Content and Sequence of Courses. Under their direction, four introductory course outlines have been developed (described in Commission Publication No. 4, New Approaches in Introductory College Geography Courses). Three of these course outlines are being taught at selected universities during the 1967-1968 academic year. Dr. Robert B. McNee is teaching "Introduction to Geographic Behavior" at the University of Cincinnati; Dr. Ann E. Larimore is teaching "World Regional Geography" at the University of Michigan; and Dr. Kennard W. Rumage is teaching "Introduction to Geography: A Spatial Approach" at the University of Iowa. These field trials are being

evaluated under the direction of Dr. J. Thomas Hastings, Director of the Center for Instructional Research and Curriculum Evaluation, University of Illinois.

A Subpanel on the Teaching of Climatology is directing the development of a course outline in climatology emphasizing the interdisciplinary approach. Dr. J. Ross MacKay, University of British Columbia, and Dr. Edward B. Espenshade, Jr., Northwestern University, serve as co-chairmen of this subpanel which is composed of representatives of the Commissions on College Geography, Education in Agriculture and Natural Resources and Undergraduate Education in the Biological Sciences. Dr. David H. Miller, University of Wisconsin, Milwaukee, is writing the course outline. A second course outline in economic geography is being developed by Dr. Michael E. Eliot Hurst, Simon Fraser University, and Dr. Robert McDaniel, University of Western Ontario. This course is designed for the advanced level. Both of these course outlines will be completed and published by the summer of 1968.

A Panel on Methods and Materials is developing materials and new methods of presentation to supplement college geography courses. Dr. George Kish, University of Michigan, serves as chairman of this panel. A subpanel focuses their efforts on the development of resource papers. Dr. Robert H.T. Smith, University of Wisconsin, serves as chairman of this subpanel. Three resource papers are presently being prepared and will be completed by June 1968. These resource papers are "Remote Sensing", Dr. Arch B. Gerlach, Staff Geographer, USGS; "Air Pollution", Dr. Reid A. Bryson, University of Wisconsin, and "Theories of Urban Location", Dr. Brian J. L. Berry, University of Chicago. A Subpanel on Geographic Media is investigating ways of developing teaching aids and audio-visual materials to supplement resource papers and course outlines. Dr. Kish serves as chairman of this subpanel.

A Panel on Program Inventory and Development is investigating major and minor programs in college geography at selected institutions. It is planned to publish the results of these investigations in June 1968. Dr. John Fraser Hart, University of Minnesota, is chairman of this panel.

The Commission has a Panel on Interdisciplinary Cooperation investigating ways and means in which geography can develop courses and programs with related disciplines. Dr. William A. Hance, Columbia University, is chairman of this panel.

Dr. Saul B. Cohen, Clark University, is chairman of the Panel on Teacher Improvement. This panel is investigating ways and means to enrich the subject matter and improve the teaching skills of college teachers of geography. A Subpanel on Summer Institutes, chaired by Dr. Edward J. Taaffe, Ohio State University, has developed, in conjunction with selected universities, several summer institutes for college teachers. These institutes have been conducted at the University of Minnesota (1966, 1967), Ohio State University (1966), and the University of Florida (1968). This subpanel, in cooperation

with the Subpanel on the Teaching of Climatology, is developing a Summer Institute in Climatology to be held in either 1968 or 1969.

A subpanel is investigating the role of field work in geographic education. The chairman of this subpanel is Dr. John Fraser Hart, University of Minnesota. Tentatively, the results of their investigations will be published and distributed upon request to members of the profession and related fields.

J. DESCRIPTION OF MATERIALS ALREADY PRODUCED:

1. CCG Pub. No. 1: Geography in Undergraduate Liberal Education, 1965.
2. CCG Pub. No. 2: A Basic Geographical Library: A Selected and Annotated Book List for American Colleges, 1966.
3. CCG Pub. No. 3: Geographic Manpower: A Report on Manpower in American Geography, 1966.
4. CCG Pub. No. 4: New Approaches in Introductory College Geography Courses, 1967.
5. CCG Pub. No. 5: Introductory Geography: Viewpoints and Themes, 1967.

Informal reports:

6. "Undergraduate Major Programs in American Geography".
7. "Geography in Interdisciplinary Studies".

K. MATERIALS AVAILABLE FREE: Items 1, 3, 6, and 7 are available free but the supply is limited. May be ordered from Commission on College Geography, Eastern Michigan University, Ypsilanti, Michigan 48197.

L. MATERIALS PURCHASABLE: Items 2, 4, and 5 may be purchased for $1.00 per copy from Association of American Geographers, 1146 Sixteenth St., N.W., Washington, D.C. 20036.

M. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

N. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: No definite plans at the present to translate materials in other languages.

O. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: A summary of the current project activities is included in Section I.

P. PLANS FOR THE FUTURE: The full commission is scheduled to meet three times over the course of a calendar year; and the Commission panels and subpanels are scheduled to meet two to four times each during the 1968-1969 period. Proposed publications include the course outlines in Climatology and Economic Geography; the evaluation of the field trials of three introductory course outlines presently being taught at the Universities of Cincinnati, Iowa and Michigan; three resource papers on Remote Sensing, Air Pollution and Theories of Urban Location; a document concerned with major and minor programs in college geography; a report of the role of field work in geographic education; and several newsletters.

During the 1968-1969 academic year the Commission plans to develop several computer-assisted learning units, on an experimental basis, to implement subject matter materials. These units will be laboratory exercises in economic and physical geography designed for introductory courses; and investigative exercises, larger in scope, designed to encourage independent investigations concerning major problems.

Beginning in the summer of 1968, the Commission plans to develop additional resource papers to supplement college geography courses and programs as part of a series. The topics of these papers will be carefully selected to fit into an orderly structured framework designed to provide materials for classroom instruction concerning new research developments in the field and related disciplines. An additional series is planned concerned with "how to do" or program supplementary papers concerned with such topics as the role of field work in geographic education, the use of audio-visual materials in college geography programs, and the application of network and graphy theory to transport problems.

The Commission is deeply concerned with the problem of improving geography courses and programs in the two-year colleges. It is recognized that many students entering the four-year colleges and universities will have had one or two years work at the junior college level. The problem of qualified teachers, modern courses and curriculums, and physical facilities will be investigated by a panel of carefully selected persons beginning in the summer of 1968. It is hoped that a concrete program can be developed that will provide a structured framework for improving geography in the two-year colleges.

The Commission recognizes the problem of training secondary teachers of geography. The shortage of teachers and the absence of recent developments in the field in the high school curriculums is of major concern. A panel will be established in the summer of 1968 to investigate the development of college programs to prepare secondary teachers of geography, in cooperation with the High School Geography Project.

A. NAME OF COMMISSION: COMMISSION ON COLLEGE PHYSICS (CCP).

B. CHAIRMAN OF COMMISSION: Dr. E. Leonard Jossem, Department of Physics, The Ohio State University, Columbus, Ohio 43210. Tel. 614-293-5713.

C. DIRECTOR OR EXECUTIVE SECRETARY:
Contact: Dr. John M. Fowler, Director, Commission on College Physics, Department of Physics and Astronomy, University of Maryland, 4321 Hartwick Road, College Park, Md. 20740. Tel. 301-779-5224.

D. PRINCIPAL PROFESSIONAL STAFF: Ben A. Green, Jr., Staff Physicist; John W. Robson, Staff Physicist; Philip DiLavore, Staff Physicist.

E. PROJECT SUPPORT:
1. Organizational sponsorship: American Association of Physics Teachers.
2. Funding agency: National Science Foundation.

F. COMMISSION HISTORY:
1. Principal originators: Participants at final meeting of series of three national conferences on the improvements of college physics courses, held 1959-1960.
2. Date and place of initiation: First meeting held June 15-16, 1960; New York.
3. Reason for initiation: "To analyze the aims and substance of college physics courses and the resources for improving such courses, and to formulate plans for the improvement of the teaching of physics at the college level throughout the country" ("Report of Conference on the Improvement of College Physics Courses," Am. J. Phys., 28, 1960).

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PURPOSES AND OBJECTIVES: "...the Commission considers its primary functions to be the collection and dissemination of information about curricular developments, the critical appraisal of the effectiveness of these developments, the consideration of what additional efforts are needed, and the stimulation of responsible groups of physicists toward course and curriculum development. Actual operations, such as the development, production, and distribution of new written materials, apparatus, films, etc., are, of course, the ultimate objectives, but the Commission engages directly in these activities only when it finds urgent needs that are not being met by existing institutions and which do not appear likely to be satisfied by anything less than a national effort for which no present agency exists..." (Am. J. Phys., 30, 665, 1962).

I. PROJECTS NOW UNDERWAY:
1. See Biennial Report 1966-68, pp. 2-3.
2. Panel on the Preparation of Physics Teachers; Chairman: Robert L. Sells, State University College of New York--

Geneseo.
3. Panel on New Instructional Materials; Chairman: Edward D. Lambe, State University of New York--Stony Brook.
4. Intercommission Panel on the Junior Colleges; Chairman: Arnold A. Strassenburg, American Institute of Physics, 335 East 45th Street, New York, N.Y.

J. DESCRIPTION OF MATERIALS ALREADY PRODUCED:

CCP Publications 1966-1968:

1. Instruction by Design, A Report on the Conference on New Instructional Materials in Physics held at the University of Washington, Summer, 1965 (published May 1966).
2. The Computer in Physics Instruction, Report of the Conference on the Uses of the Computer in Undergraduate Physics Instruction held November 4-6, 1965 at The University of California, Irvine (published July 1966).
3. The Production and Use of Single Concept Films in Physics, Report of the Conference on Single Concept Films in College Physics held December 15-17, 1966, at Rensselaer Polytechnic Institute (published January 1968).
4. Short Films for Physics Teaching, A catalog (published October 1967).
5. Preparing High School Physics Teachers, Report of the Panel on the Preparation of Physics Teachers (published January 1968).
6. Progress Report of the CCP: 1964-1966.
7. The Second Ann Arbor Conference on Curricula for Undergraduate Majors in Physics (1967 reprint).
8. The College Commissions (jointly published by the eight college science commissions), July 1967.
9. Commission on College Physics by John M. Fowler, a reprint from Physics Today, March 1967.
10. The Proceedings of the Boulder Conference on Physics for Nonscience Majors, 1964.
11. Progress Report of the CCP: 1962-64.
12. Outline of a Course in Plasma Physics, 1963.
13. Homemade High Vacuum Techniques, CCP Staff and MIT Science Teaching Center, 1964.
14. Undergraduate Curricula in Physics: A Report on the Princeton Conference on Curriculum S, E. Leonard Jossem, 1964.
15. The Berkeley Physics Laboratory, Alan M. Portis, 1964.
16. Sealing with Solder Glass, Robert H. Dalton, 1963.
17. Experiences with Solder Glass and the Student, John G. King, 1964.
18. Power Supply for Penning Vacuum Gauge, Jan Orsula, 1964.
19. Basic Themes of Physics by Edwin A. Uehling (out of print).
20. Bonds Between Atoms by Alan Holden (out of print).
21. Conceptual Foundations of Quantum Mechanics by Leonard Eisenbud.
22. Crucial Experiments in Quantum Physics by George L. Trigg (out of print).
23. Distributions by Wayne A. Bowers.

24. Electricity and Magnetism. I. Electrostatics by Melba Phillips.
25. Electricity and Magnetism. II. Magnetostatics by Melba Phillips.
26. Electricity and Magnetism. III. Circulation Laws and Their Consequences by Richard T. Mara.
27. Experimental Introduction to Kinetic Theory by Harold Daw.
28. Heat and Motion by Norman Pearlman.
29. Heat Motion in Matter by J. Gregory Dash.
30. Interference and Diffraction by Marc H. Ross.
31. Matter in Motion by Robert M. Cotts.
32. Motion by James Gerhart.
33. The Nature of Atoms by Alan Holden.
34. The Symmetry of Natural Laws by Laurie M. Brown (out of print).
35. Wave Mechanical Properties of Stationary States by Alan Holden (out of print).
36. What Can the Matter Be? by Jack A. Soules.

Momentum Books:

37. Elementary Particles by David H. Frisch and Alan M. Thorndike.
38. Radio Exploration of the Planetary System by Alex G. Smith and Thomas D. Carr.
39. The Discovery of the Electron by David L. Anderson.
40. Waves and Oscillations by R.A. Waldron.
41. Crystals and Light by Elizabeth A. Wood.
42. Temperatures Very High and Very Low by Mark W. Zemansky.
43. Polarized Light by William A. Shurcliff and Stanley S. Ballard.
44. Structure of Atomic Nuclei by C. Sharp Cook.
45. An Introduction to the Special Theory of Relativity by Robert Katz.
46. Radioactivity and Its Measurement by W.B. Mann and S.B. Garfinkel.
47. Plasmas--Laboratory and Cosmic by Forrest I. Boley.
48. Infrared Radiation by Ivan Simon.
49. The Physics of Musical Sound by Jess J. Josephs.
50. The Freezing of Supercooled Liquids by Charles A. Knight.
51. Radio Exploration of the Sun by Alex G. Smith.
52. Magnets by L.W. McKeehan.
53. The World of High Pressure by John W. Stewart.
54. Magnetohydrodynamics by Noel C. Little.
55. The Winds by George M. Hidy.
56. CCP Newsletters #1-14.

K. MATERIALS AVAILABLE FREE: All the materials listed are available free of charge from the CCP office.

L. MATERIALS PURCHASABLE: None.

M. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

N. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN

TRANSLATION: Six volumes of the CCP-sponsored Momentum Book Series have been translated into Polish; 5 into Swedish; and 1 into French for publication in French Canada.

I. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT:

1. Report of the Conference on the Use of the Single Concept Film in College Physics (held at Rensselaer Polytechnic Institute, 15-17 December 1966), published January 1968. The conference also resulted in a catalog of Short Films for Physics Teaching, December 1967.
2. Preparing High School Physics Teachers, Report of the Panel on the Preparation of Physics Teachers, January 1968.
3. Biennial Report 1966-68, presented at the annual AAPT-APS meeting, Chicago, 28 January - 1 February 1968.

II. PLANS FOR THE FUTURE:

1. Progress Report, June 1968.
2. A conference of the CCP's newly organized panel on physics instruction in the two-year colleges.
3. An article by John M. Fowler on "Interdisciplinary Courses," submitted for the March 1968 issue of Physics Today.
4. Continued experimentation with computer-assisted instruction (CAI).
5. A programmed instruction workshop.
6. A diversified number of summer activities which could lead to the production of pilot models for new courses as well as generate new ideas for existing courses. Major emphasis is to be on improvement of the laboratories in introductory courses.

A. NAME OF COMMISSION: COMMISSION ON EDUCATION IN AGRICULTURE AND NATURAL RESOURCES (CEANAR).

B. CHAIRMAN OF COMMISSION: Dr. Russell E. Larson, Dean, College of Agriculture, The Pennsylvania State University, University Park, Pennsylvania 16802. Tel. 814-865-2541.

C. DIRECTOR OR EXECUTIVE SECRETARY:
Contact: Richard E. Geyer, Executive Secretary, National Academy of Sciences, 2101 Constitution Avenue, N.W., Washington, D.C. 20418. Tel. 202-961-1761.

D. PRINCIPAL PROFESSIONAL STAFF: Richard E. Geyer, Executive Secretary.

E. PROJECT SUPPORT:
1. Organizational sponsorship: Agricultural Board, Division of Biology and Agriculture, National Academy of Sciences-National Research Council.
2. Funding agency: National Science Foundation.

F. COMMISSION HISTORY:
1. Principal originator: Organizational sponsor.
2. Date and place of initiation: 1961; National Academy of Sciences-National Research Council.
3. Reason for initiation: See Section H.

G. PRESENT COMMERCIAL AFFILIATIONS: Agricultural Board is affiliated with Agricultural Research Institute, which has largely commercial membership.

H. PURPOSES AND OBJECTIVES: The Commission has two major purposes. The first is to review trends in education in agriculture for students majoring in agriculture and renewable natural resources; stimulate discussion, re-evaluation and improvement in undergraduate courses and curricula; and prepare recommendations for the development of academic programs in the future. The second is to assist in the development of the agricultural and natural resource aspects of general education.

I. PROJECTS NOW UNDERWAY:
1. Western Region Conference on Education in the Biological Sciences for Students in Agriculture and Natural Resources, 22-23 February 1968, Reno, Nevada -- Northeast Region Conference on Education in the Biological Sciences for Students in Agriculture and Natural Resources, 2-3 May 1968, Hartford, Connecticut.
2. Panel on Agriculture and Natural Resources in General Education - Darrel S. Metcalfe (Co-Chairman), Director of Resident Instruction, College of Agriculture, University of Arizona and Lloyd E. Partain, (Co-Chairman), Asst. to the Administrator on Recreation, Soil Conservation Service, U.S. Department of Agriculture.
3. Panel on Two-Year Programs - A.R. Hilst (Chairman), Professor, Department of Agronomy, Purdue University.
4. Committee on Chemistry - C. Edmund Marshall (Chairman),

Acting Dean, Graduate School, Department of Soils, 203 Jesse Hall, University of Missouri.
5. Committee on Physics - Otto H. Schmitt (Chairman), Professor of Biophysics, School of Physics and Astronomy, University of Minnesota.
6. Committee on Mathematics - H.L. Lucas, Professor & Director, Bio-mathematics Program, North Carolina State University.
7. Committee on Social Science - (New committee, no chairman appointed yet).
8. Committee on Agricultural Education - Ray M. Kottman (Co-Chairman), Dean, College of Agriculture & Home Economics; Director, Ohio Agricultural Research & Development Center and Director, Ohio Cooperative Extension Service, The Ohio State University and Darrel S. Metcalfe (Co-Chairman), Director of Resident Instruction, College of Agriculture, University of Arizona.
9. Committee on Evaluation of Teaching Materials in Animal Science - R.C. Eaton, Director of Public Relations, Ralston-Purina Co., 835 South 8th Street, St. Louis, Missouri (Chairman).
10. Symposia co-sponsored with professional societies in forestry, agricultural engineering, and agricultural education.
11. Visiting Specialists and Visiting Panel Programs.

J. DESCRIPTION OF MATERIALS ALREADY PRODUCED:

1. The Agricultural Sciences. 1965. BioScience 15(5):349.
2. Report of a Seminar on Opportunities in Business for B.S. Graduates of Colleges of Agriculture. 1964.
3. Feed Manufacturers of the Future. Based on a pilot study. Feed Age, 15(10):22.
4. Trends and Issues in Education in the Agricultural Sciences. 1964. BioScience 15(11):711.
5. Geyer, Richard E. 1965. Training for Applied Biology.
6. Proceedings of the Conference on Undergraduate Education in Dairy Science. August 10-11, 1965. Lincoln, Nebraska. Journal of Dairy Science 1966:525-600.
7. Geyer, Richard E. 1966. Outdoor Recreation and Parks Management Curricula in Colleges of Agriculture and Forestry.
8. Larson, Russell E. (Chairman). 1967. Activities of the Commission on Education in Agriculture and Natural Resources.
9. Teachers of Agricultural Economics. 1966. Proceedings, Symposium, Virginia Polytechnic Institute, August 17-20, Farm Economics 49(1):Part II.
10. Undergraduate Education in the Biological Sciences, Agriculture and Natural Resources. 1967. Symposium papers. Science Education 51(2):116-129.
11. Biological Sciences Action Committee Reports. 1967.
    Action Committee on Social Science.
    Action Committee on Agricultural Education.
    Action Committee on Animal Science.
    Action Committee on Natural Resources.
    Action Committee on Food Science.
    Action Committee on Bioengineering.

Action committee on Plant and Soil Science.
12. Undergraduate Teaching in Poultry Science. 1968.

The following Commission publications must be purchased from the National Academy of Sciences.
13. Threads of Life. 1964. A brochure describing careers in agricultural science. Minimum quantity: 50. 10¢ per copy for 50-499; 5¢ per copy for 500 or more. Smaller quantities may be obtained from colleges of agriculture.
14. Undergraduate Education in the Biological Sciences for Students in Agriculture and Natural Resources. Proceedings of a conference. Publication 1495, 1967. $3.00.
15. Undergraduate Teaching in the Animal Sciences. Proceedings of a conference. Publication 1486, 1967. $3.00.
16. Undergraduate Education in Renewable Natural Resources: An Assessment. Publication 1537, 1967. $2.00.

The following publications resulted from activities co-sponsored by the Commission and other organizations. They must be ordered from the organization indicated.
17. Conference on Undergraduate Education in Horticultural Science. Proceedings, 1966. $2.00. American Society of Horticultural Science, P.O. Box 109, St. Joseph, Michigan 49805.
18. NACTA and the Professional Societies. Symposium proceedings, Journal of the National Association of Colleges and Teachers of Agriculture, September, 1967. $3.00. National Association of Colleges and Teachers of Agriculture, John A. Write, Editor, Louisiana Polytechnic Institute, Ruston, Louisiana 71270.

Note: Numerous additional publications will be available in the next year. Revised publication lists will be available from the Commission office.

K. MATERIALS AVAILABLE FREE: Items 1-12 free from the Commission.

L. MATERIALS PUBCHASABLE: Items 13-18, see Section J for addresses.

M. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

N. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: None.

O. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: Most of the items in Section I.

P. PLANS FOR THE FUTURE: Continuation and completion of items in Section I. Numerous new publications -- contact Commission office for revised lists. Project completion date: July 1, 1969.

A. NAME OF COMMISSION: COUNCIL ON EDUCATION IN THE GEOLOGICAL SCIENCES (CEGS).

B. CHAIRMAN OF COMMISSION: Dr. William R. Muehlberger, Chairman, University of Texas at Austin 78712. Tel. 512-GR1-1347.

C. DIRECTOR OR EXECUTIVE SECRETARY:
Contact: Dr. Peter Fenner, CEGS, or David M. Delo, CEGS, 1444 N Street NW, Washington, D.C. 20005. Tel. 202-234-2758, ext. 55 or 54.

D. PRINCIPAL PROFESSIONAL STAFF: Dr. Peter Fenner, Acting Director; David M. Delo, Program Coordinator.

E. PROJECT SUPPORT:
1. Organizational sponsorship: American Geological Institute.
2. Funding agency: National Science Foundation.

F. COMMISSION HISTORY:
1. Principal originator: American Geological Institute.
2. Date and place of initiation: February 1965; Baylor University, Waco, Texas.
3. Reason for initiation: To carry out the recommendations made by its predecessor, GEO-Study (1962-1964). GEO-Study was organized to investigate the status of undergraduate geological education in response to charges that geology lacked purpose and direction, that its curricula were outmoded and obsolete, that it was static and no longer attracted gifted students. CEGS, therefore, is an action agency whose objectives have been derived from the findings of GEO-Study.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PURPOSES AND OBJECTIVES: To maintain continuous inquiry into the state of geological education at the undergraduate level and to provide detailed recommendations and guidelines in problem areas; to encourage and assist in the development of new educational materials and programs; to review and evaluate projected programs in geologic education and provide for communication and central consultation on educational improvement in the geological sciences; and to work through existing organizations and involve the widest spectrum of the teaching profession in various activities.

I. PROJECTS NOW UNDERWAY:
GENERAL: CEGS activities deal with principal needs of undergraduate geological education in an integrated, sequential fashion, and promote the utilization of a systematic rationale for change in educational patterns. The crux of CEGS plans lies in recognizing educational needs of today's and tomorrow's geology students. The Analysis of Skills program will provide information essential to this goal.

ANALYSIS OF SKILLS: Panel Chairman, Dr. Robert Reeves, U.S. Geological Survey. The objectives are to obtain and organize information about the skills and abilities required by geologists today and for tomorrow. These data will be analyzed in terms of

priorities of educational needs for future geology students. Information is being obtained from a variety of industrial, governmental, and educational institutes and agencies that hire geologists.

CURRICULUM PROGRAM: Panel Chairman, Dr. Robert H. Dott, Jr., University of Wisconsin. To provide curricular options for existing and newly emerging geology departments. Main emphasis is placed on undergraduate programs. Guidelines will be organized on a topical basis without reference to course titles. Of prime concern is the integration of geology with related subject matter. Guidelines will deal with all needs of geologic instruction, including relevant aspects of the cognate sciences, social sciences, and humanities. The basic framework for the guidelines will be derived from the ANALYSIS OF SKILLS final report.

INTRODUCTORY COURSE PROGRAM: Panel Chairman, John Bowen, Cuesta Junior College. The objective is to promote creation of more stimulating and challenging approaches to the introductory course in geology, by offering selected experimental course designs, outlines, and materials.

INSTRUCTIONAL MATERIALS PROGRAM: Panel Chairman, Dr. George R. Rapp, Jr., University of Minnesota, Minneapolis, Minnesota. The objective is to stimulate geology teachers to design their own new teaching materials, by supporting the design and distribution of experimental interdisciplinary problem-oriented instructional aids. Materials from this program can be utilized in the INTRODUCTORY COURSE PROGRAM, and the PROFESSIONAL DEVELOPMENT PROGRAM.

PROFESSIONAL DEVELOPMENT PROGRAM: Panel Chairman (1967), William R. Muehlberger; Panel Chairman for 1968 has not yet been chosen. The major aim is to promote continued education of geology teachers by offering a sequential series of related self study and formal study programs. The self study portion will include materials such as bibliographies, short reviews and will include guidelines to proficiency levels in specific geologic topics or techniques. The formal study portion of the program will include short courses, institutes, and opportunities for various types of personnel exchange.

RELATED PROGRAMS: Earth Science Teacher Preparation: CEGS plans to coordinate activities with the Earth Science Curriculum Project (ESCP) regarding problems in the preparation of earth science teachers.

J. DESCRIPTION OF MATERIALS ALREADY PRODUCED: (All have been published in the Journal of Geological Education).

Panel Reports:

1. Introductory Geology in the Framework of Liberal Arts Studies (1965).
2. Geology as an Interdisciplinary Experimental Science (1966).
3. Earth Science Teacher Preparation (1966).
4. Mathematics Recommendations for Undergraduate Geology

5. Keeping Abreast of the Wave (1966).

Short Reviews:

6. S.R. #1, Experimental Petrology: an Indoor Approach to an Outdoor Subject, by Peter J. Wyllie (1966).
7. S.R. #2, The Development and Evolution of Hillslopes, by S.A. Schumm (1966).
8. S.R. #3, Heat Flow in the Earth, by Gene Simmons (1966).
9. S.R. #4, Shock Processes in Geology, by Nicholas Short (1966).
10. S.R. #5, Pediments and Pediment-Forming Processes, by Richard F. Hadley (1967).
11. S.R. #6, Rates of Denudation, by Dale F. Ritter (1967).
12. S.R. #7, Recent Carbonate Sediments - An Unconventional View, by Keith Chave (1968).

Other:

13. Courses in Geology for Advanced Non-Majors (1965).
14. Evolution as a Geologic Concept: An Introductory Geology Course (1965).
15. Paperback Books for Earth Science Teachers (1967).
16. CEGS Newsletter issues #1 - #4.

K. MATERIALS AVAILABLE FREE: Single copies of all CEGS materials including the Newsletter are mailed free of charge to all individuals on the CEGS mailing list. Single copies are also available from CEGS, 1444 N Street, NW, Washington, D.C. 20005.

L. MATERIALS PURCHASABLE: None.

M. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

N. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: None at the present time.

O. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: CEGS has relocated to AGI headquarters in Washington, D.C. Dr. William R. Muehlberger has succeeded Dr. William W. Hambleton as Chairman, and changes have occurred in staff and Council composition. CEGS is concentrating on the developmental stages of its programs now that Panel investigations have been completed. Programs are in various stages of development ranging from analysis of techniques to gathering valid information in the ANALYSIS OF SKILLS effort, to initial publications, as in the INSTRUCTIONAL MATERIALS PROGRAM.

P. PLANS FOR THE FUTURE: Plans focus on completion of on-going and newly initiated program activities: continued production of experimental instructional materials; additional review articles; investigation of earth science teacher preparation problems with recommendations; lists of sources for items of interest to geology teachers (e.g. research funds, instructional aids, films); continuation of Newsletter; possible consulting services for departments requesting curriculum advice.

A. NAME OF COMMISSION: COMMISSION ON ENGINEERING EDUCATION.

B. CHAIRMAN OF COMMISSION: Gordon S. Brown, Dean, School of Engineering, Massachusetts Institute of Technology, Cambridge, Mass. 02139. Tel. UN 4-6900.

C. DIRECTOR OR EXECUTIVE SECRETARY:
Contact: Newman A. Hall, 1501 New Hampshire Ave., NW, Washington, D.C. 20036. Tel. 332-7970.

D. PRINCIPAL PROFESSIONAL STAFF: David C. Miller, Senior Staff Associate; Jean P. Moore, Administrative Assistant.

E. PROJECT SUPPORT:
1. Organizational sponsorship: None.
2. Funding agencies: NSF, Charles F. Kettering Foundation (current).

F. COMMISSION HISTORY: Supported by a grant from the National Science Foundation, a group of engineering educators met at the University of Colorado, Boulder, in August 1961. Much of the conference discussion revolved around an organization to carry out the national effort required to accelerate the developing of engineering education for the future. The Conference proposed that a Commission on Engineering Education be established, independent of any other organization. It was charged with finding ways to develop, in a balanced manner programs for faculty development curricula and facilities, preparation, production and testing of instructional learning materials, and studies of the characteristics of engineering students to serve as a basis for the improvement of instruction, assessments of the result of engineering education and an increase in the efficiency of the educational process. The Commission was incorporated in 1963 and began operations with funds provided by NSF. Additional funds for specific projects have been provided by NSF and other private funding organizations.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PURPOSES AND OBJECTIVES: See Section F.

I. PROJECTS NOW UNDERWAY:
1. Build: Institutional Development Program.
2. Cosine: Computer Sciences in Electrical Egnineering.
3. Studies: Adaptations of the Engineering Concepts Curriculum Project for non-science majors, freshman engineering students, vocational and technical institute students; educational software for computers; computer animation in educational films; educational technology.

J. DESCRIPTION OF MATERIALS ALREADY PRODUCED:
1. Interim Report, Computer Sciences in Electrical Engineering.
2. Annual Reports: Years 1965, 1966, 1967.
3. Preliminary Text: The Man Made World (for the ECCP Project).
4. Motion Pictures for Engineering Education (out of print).

K. MATERIALS AVAILABLE FREE: Items 1 and 2 from Commission on Engineering Education, 1501 New Hampshire Ave., NW, Washington, D.C. 20036.

L. MATERIALS PURCHASABLE: None.

M. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

N. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: None.

O. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: (Not answered).

P. PLANS FOR THE FUTURE: Plans to bring the Commission on Engineering Education into the structure of the National Academy of Engineering have been announced by the two organizations. Formal dissolution of the Commission as a corporation is to be accomplished not later than March 1, 1969. In the interim, the Commission will continue to administer existing programs. New projects will be handled by the Committee on Engineering Education within the Academy. Membership of the newly-established committee is the same as that of the Board of Directors of the Commission.

A. NAME OF COMMISSION: COMMISSION ON UNDERGRADUATE EDUCATION IN THE BIOLOGICAL SCIENCES (CUEBS).

B. CHAIRMAN OF COMMISSION: Dr. Henry Koffler, Department of Biological Sciences, Purdue University, Lafayette, Indiana 47907. Tel. 317-92-2665.

C. DIRECTOR OR EXECUTIVE SECRETARY:
Contact: Mr. Martin W. Schein, CUEBS, Suite 403, 1717 Massachusetts Avenue, N.W., Washington, D.C. 20036. Tel. 202-232-1166.

D. PRINCIPAL PROFESSIONAL STAFF: Dana L. Abell, Associate Director; E.G. Stanley Baker, Staff Biologist; Jeffrey J.W. Baker, Staff Biologist; Thomas G. Overmire, Staff Biologist; Donald L. Wise, Staff Biologist.

E. PROJECT SUPPORT:
1. Organizational sponsorship: (Not answered).
2. Funding agency: National Science Foundation grant to the George Washington University.

F. COMMISSION HISTORY:
1. Principal originators: Education Committee, AIBS.
2. Date and place of initiation: July 1, 1963; Washington University, St. Louis, Mo.
3. Reason for initiation: (Not answered).

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PURPOSES AND OBJECTIVES: The Commission was established to analyze objectively the present status of biology in American colleges and universities. Biologists throughout the country have participated in study panels to make recommendations on ways and means of solving problems in undergraduate biological education. The primary concern of the Commission is to assure that college biology courses reflect the modern discipline by shortening the time gap between the publication of research results and their reporting in the classroom. Program emphasis is on improving and modernizing biology curricula, as well as assisting instructional personnel to keep informed of developments in modern biology.

I. PROJECTS NOW UNDERWAY:
The following panels and committees are concerned primarily with curricular needs:

The Panel on the Laboratory in Biology (Peter Abramoff, Marquette University, Chairman) has focused its attention on the concept of an independent investigational laboratory, and is currently writing a position paper developing this concept. A parallel paper on alternative routes to improvement of laboratory instruction is being prepared by Associate Director Dana Abell.

The Panel on Interface Areas (Jay Barton II, West Virginia University, Chairman) has been involved thus far with activities in the areas of biology-chemistry and biology-mathematics. In

the chemistry interface area a small group is seeking to identify chemical information that is essential as background for the Core Curriculum Master Item List (CUEBS Publication 18, appendix A). In biology-mathematics the Panel is examining the possibility of sponsoring a series of monographs on the application of mathematics to selected biological disciplines, and of a book introducing biologists to the use of mathematical models in biology instruction. The Panel is working closely with a similar group sponsored by the CUPM in the area of biology-mathematics.

The Panel on Preprofessional Training in the Medical Sciences (Tom Roos, Dartmouth University, Chairman) has completed a statistical analysis of preprofessional training requirements for medical science professions, and is currently preparing a report of its findings.

The CUEBS-BSCS sponsored Biology Methods Committee (Ted F. Andrews, Educational Research Council, Chairman) has completed its work on a set of educational materials for use in the preparation of high school biology teachers, and is now preparing a final report incorporating recommendations to BSCS and CUEBS for future action in this area.

A Committee on the Structure of Biology (Garland E. Allen, Washington University, Chairman) was convened last summer to plan a symposium entitled "Explanation in Biology: Scientific, Philosophical and Historical Aspects," scheduled for June 7-11, 1968. A proposal for funding the planned symposium was submitted to the Division of Social Sciences, National Science Foundation, in November 1967.

The Committee on Biology for the Non-Major (Thomas Hall, Washington University, Chairman) held a conference in Bar Harbor, Maine, September 8-9, 1967, to discuss the content, aims and philosophy of an upper-level biology course for non-majors. Several syllabi were developed at this conference; these are being tested at various institutions during the 1967-68 academic year. CUEBS Publication No. 19, Biology for the Non-Major, is a direct outgrowth of the work of this committee.

Instructional support programs, preparation of personnel, and facilities development have been the primary concern of the following panels:

The Panel on College Instructional Personnel (William K. Stephenson, Earlham College, Chairman) has worked through three subpanels, each concentrating on different problems of instructional personnel. The Pre-Service Subpanel has collected a set of model seminars dealing with pre-service preparation of college teachers; the collection is now being coordinated and edited for possible publication. A survey is currently being conducted to determine what kinds of preparation for college teaching are included in existing graduate programs. The Subpanel on Institutes, Conferences and Refresher Courses is examining the current offerings of the NSF Summer Institute

Program, and will complete its assignment with a set of recommendations for program needs over the next five years. The In-Service Subpanel is examining ways and means of providing for continual up-dating of college teachers.

The Panel on Evaluation and Testing (Clarence H. Nelson, Michigan State University, Chairman) completed its mission with publication of the booklet, Testing and Evaluation in the Biological Sciences, and will be dissolved in the near future.

A Panel on Biology in the Two-Year College (Martin D. Brown, Fullerton Junior College, Chairman) has focused its attention on the problems of terminal or occupational biology programs, and is now completing a position paper analyzing these problems and offering suggestions for future activity in the area of biology in two-year colleges.

The Panel on Biological Facilities (C. Ritchie Bell, University of North Carolina, Chairman) is nearing completion of a Basic Library List to assist undergraduate institutions in developing their library holdings in biology. The Panel has also contributed several additions to the packet, Guidelines for Planning Biological Facilities.

The following projects are underway under the direction of the Executive Office:

CUEBS maintains an active Consultants Bureau to assist institutions in self-evaluation. The bureau operates two distinct services, a curriculum consultant service and a facilities consultant service. Inquiries are invited.

With the assistance and active participation of CUEBS personnel, the regional conference program initiated in 1966 has expanded to cover virtually every area of the country. Many groups are now planning their second conference under this program. As a direct result of the regional conferences a significant number of on-going organizations of biologists have been created, providing a major channel for the dissemination of information on innovations in biology teaching.

As a consultant to CUEBS, Donald H. Bucklin is conducting a feasibility study for a Center for Biological Education. His study deals with the need for and the content and operation of such a center, and will be completed by June 1968.

David G. Barry is also working with the Executive Office to develop a plan for examining the implications of administrative structure on the teaching of biology. The proposed strategy involves working with David Knapp (Director of the Institute for College and University Administrators, American Council on Education) in conducting a number of case studies of institutions with varying administrative structures.

J. DESCRIPTION OF MATERIALS ALREADY PRODUCED:

1. New Directions in Biology Teaching. Thomas S. Hall, 1964. BioScience, 14 (4):31-33. (out of print).
2. Report on the Activities of the Commission on Undergraduate Education in the Biological Sciences, July 1, 1963 - June 30,

[illegible]. [illegible]. [illegible] out of print.
[illegible] Iowa Summer Institutes for Undergraduate Majors. 1964. BioScience, [illegible].
[illegible] Institute. August, 1964. (out of print).
[illegible] Institutes for Graduate Fellows in the Biological Sciences. September, 1964. (out of print).
[illegible] Report of the Eastern Regional Conference on Courses and Materials in the Biological Sciences. December, 1964.
[illegible] Institute. December, 1964. Revised August, 1965.
[illegible] Report of the Midwestern Regional Conference on Courses and Materials in the Biological Sciences. February 1965.
[illegible] Report of the Southeastern Regional Conference on Courses and Materials in the Biological Sciences. April 1965.
[illegible] Report of the Southwestern Regional Conference on Courses and Materials in the Biological Sciences. July 1965.
[illegible] Report of the Conference on the Training of Biology Teachers. [illegible] out of print.
[illegible] Integrating the Inner City Biology Teacher. Sanford E. Ginsburg, [illegible]. BioScience, 16 pp. [illegible].
[illegible] Guide for the Preparation of Biology Teachers. Ted F. [illegible], [illegible]. The Case and Class, 3(4): 1 p.
[illegible] Report of the Panel on Instructional Materials and Methods. [illegible]. out of print.
[illegible] Biology in a Liberal Education. February 1967.
[illegible] Guidelines for Planning Biological Facilities (published in cooperation with the American Institute of Biological Sciences). [illegible].
[illegible] Report of the Panel on Pre-Professional Training in the Agricultural Sciences. 1967. The Case 3(4):3-5.
[illegible] Impact of Area Laboratories in Biology. June 1967.
[illegible] Biology for the Two-Year. July, 1967.
[illegible] Teaching and Evaluation in the Biological Sciences. [illegible].
[illegible] Report of the Panel on Pre-Professional Training in the Agricultural Sciences. October 1967.
[illegible] Agricultural Programs, Farmers's Colleges of Agriculture.
[illegible] Report of the Design Committee on Animal Sciences.
[illegible] Report of the Design Committee on Biosngineering.
[illegible] Report of the Design Committee on Food Sciences.
[illegible] Report of the Design Committee on Natural Resources.
[illegible] Report of the Design Committee on Plant and Soil Sciences.
[illegible] Report of the Design Committee on Social Sciences.
[illegible] Case Study.
[illegible] The Case, 1 and 2, 1965.
[illegible] The Case, 1-5, 1965-66.
[illegible] The Case, 1-5, 1966-67.
[illegible] The Case, 1-5, 1967-68.

[illegible] Publication Numbers 3, [illegible] 7, 8, 9, [illegible] 15, 16, 17, 18, 21, 22, 23-5, 26.

L. MATERIALS PURCHASABLE: None.

M. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

N. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: None at this time.

O. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: Publication Numbers 16-21 have been released, each representing the completion of a major CUEBS project. Panels or committees have been established to deal with problems of interface areas, administrative structure, biology laboratory, and the structure of biology.

P. PLANS FOR THE FUTURE: Emphasis on the development of improved and modernized courses and curricula will continue, with consideration of the needs of various groups of students including those planning graduate study in biology as well as those preparing for careers at the baccalaureate level. Attention will be given to the role of the biological sciences in liberal education at the undergraduate level and the development of improved courses for non-majors. Areas of possible interdisciplinary cooperation with other sciences are being explored, as are programs designed to help teachers help themselves. Among the devices which will continue to be employed by the Commission in achieving its objectives are study panels, group meetings, conferences and publications.

A. NAME OF COMMISSION: COMMITTEE ON THE UNDERGRADUATE PROGRAM IN MATHEMATICS (CUPM).

B. CHAIRMAN OF COMMISSION: Ralph P. Boas, Department of Mathematics, Northwestern University, Evanston, Illinois 60201.

C. DIRECTOR OR EXECUTIVE SECRETARY:
Contact: Malcolm W. Pownall (after September 1, 1968, George Pedrick), CUPM, P.O. Box 1024, Berkeley, California 94701. Tel. 415-527-2363.

D. PRINCIPAL PROFESSIONAL STAFF: Malcolm W. Pownall, Executive Director; George Pedrick, Associate Director; Robert F. Jolly, Staff Mathematician; S. Katherine Black, Administrative Assistant.

E. PROJECT SUPPORT:
1. Organizational sponsorship: Mathematical Association of America.
2. Funding agency: National Science Foundation.

F. COMMISSION HISTORY:
1. Principal originator: Mathematical Association of America.
2. Date and place of initiation: 1959; (not answered).
3. Reason for initiation: Committee on the Undergraduate Program for the Mathematical Association of America.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PURPOSES AND OBJECTIVES: The study and improvement of college mathematics curricula and instruction.

I. PROJECT NOW UNDERWAY: CUPM has the following panels and ad hoc study groups currently active:
1. Panel on Teacher Training.
2. Panel on College Teacher Preparation, and ad hoc group on master's program.
3. Panel on Mathematics for Two Year Colleges, and ad hoc group on staff qualifications in two year colleges.
4. Panel on Mathematics for the Life Sciences.
5. Panel on Statistics.
6. Panel on Computing.

CUPM also maintains a Consultants Bureau whose members visit individual institutions to give advice and obtain information. The Advisory Group on Applications refers to the Commission problems arising in the applications of mathematics in this area. The Advisory Group on Communications handles publication policy; this group has prepared a Basic Library List for four year colleges and has an ad hoc group working on a similar list for two year colleges.

J. DESCRIPTION OF MATERIALS ALREADY PRODUCED:
1. Report No. 14--Annual Report, August 1965-August 1966.
2. Report No. 15--Forty-one Conferences on the Training of Teachers of Elementary School Mathematics (1966).
3. Recommendations for the Training of Teachers of Mathematics

(1961, Revised 1966).
4. A General Curriculum in Mathematics for Colleges (1965).
5. Qualifications for a College Faculty in Mathematics (1967).
6. Recommendations on the Undergraduate Mathematics Program for Engineers and Physicists (1962, 1965, Revised 1967).
7. Mathematical Engineering: A Five Year Program (1966).
8. Recommendations on the Undergraduate Mathematics Program for Work in Computing (1964).
9. Tentative Recommendations for the Undergraduate Mathematics Program for Students in the Biological, Management, and Social Sciences (1964).
10. A Curriculum in Applied Mathematics (1966).
11. Pregraduate Preparation of Research Mathematicians (1963, Revised 1965).
12. Preparation for Graduate Study in Mathematics (1965).
13. CUPM Basic Library List (1965).
14. Teacher Training Supplement to the Basic Library List (1965).
15. Consultants Bureau Brochure.
16. R.W. Hamming: Calculus and the Computer Revolution (1966).
17. T.E. Hull: The Numerical Integration of Ordinary Differential Equations (1966).
18. Proceedings of the Geometry Conference, three volumes.
19. Some Mathematical Models in Biology.

K. MATERIALS AVAILABLE FREE: All items in Section J.

L. MATERIALS PURCHASABLE: None.

M. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

N. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: (Not answered).

O. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1967 REPORT: Continuing panel activities; conference on the use of computers in high school teaching and its effect on teacher training; conferences on curriculum recommendations; conferences on college teacher qualifications; conference on Geometry in the Undergraduate Program.

P. PLANS FOR THE FUTURE: Conference on school mathematics in the 1970's and the effect on teacher training (June, 1968); continuation of panel reports, newsletters and conferences on curriculum recommendations and staff qualifications.

Science and Mathematics Materials Received from U. S. State and Local Systems

NEWLY PUBLISHED SCIENCE AND MATHEMATICS MATERIALS RECEIVED FROM STATE AND LOCAL SYSTEMS

The following newly published materials have been received at the International Clearinghouse. These titles update the comprehensive list found in Section III of the 1966 Report and the 1967 Report. The materials are filed in the Clearinghouse Archives, where they are available for visitor viewing.

IDAHO - State University Museum, Pocatello, Idaho: A Guide to Understanding Idaho Archaeology.

MARYLAND - Board of Education of St. Mary's County, Leonardtown, Maryland: Tentative Curriculum Guide Junior High Schools, 1967.

MASSACHUSETTS - Amherst Regional Junior High School, Amherst, Massachusetts: Administrative Guide to Program of Science Studies in the Amherst-Pelham Regional Junior High School; Program of Science Studies in the Amherst-Pelham Regional Junior High School.

MISSISSIPPI - State Department of Education, Jackson, Mississippi: Science in the Junior High School, 1967.

NEW YORK - The University of the State of New York, The State Education Department, The Curriculum Development Center, Albany, New York: Water Pollution, 1967; Air Pollution, 1966; Mathematics Courses for the Seventh Year and Eighth Year, 1967; Science 7, 8, 9, Block G, 1967; Science 7, 8, 9, Block H, 1967; Science 7, 8, 9, Block I, 1966; Biology An Experimental Syllabus, 1967.

Smithtown Central School District No. 1, Smithtown, New York: The Body and How It Works, Teacher's Edition, Grade 8, 1968; Maintenance of Health, Grade 9, 1968; The Planet Earth, Grade 9, 1968; Chemistry, Grade 9, 1968; Science and Change, Grade 9, 1968; Structure of Matter, Grade 8, 1968; Man and Machines, Grade 8, 1968; The Body and How It Works, Grade 8, 1968; Transformation of Energy, Grade 8, 1968; The Earth in Space, Grade 7, 1968; Water Resources, Grade 7, 1968; Biological Resources, Grade 7, 1968; The Planet Earth, Teacher's Edition, Grade 9, 1968; Maintenance of Health, Teacher's Edition, Grade 9, 1968; Chemistry, Teacher's Edition, Grade 9, 1968; Science and Change, Teacher's Edition, Grade 9, 1968; Biological Resources, Teacher's Edition, Grade 7, 1968; Atmosphere, Teacher's Edition, Grade 7, 1968; Water Resources, Teacher's Edition, Grade 7, 1968; The Earth in Space, Teacher's Edition, Grade 7, 1968; Structure of Matter, Teacher's Edition, Grade 8, 1968; Man and Machines, Teacher's Edition, Grade 8, 1968; Transformation of Energy, Teacher's Edition, Grade 8, 1968; Atmosphere, Grade 7, 1968.

TENNESSEE - Department of Education, Division of Instruction, Nashville, Tennessee: Science Bulletin, Science in the Elementary School, Grades 1-6, 1964.

Completed or Inactive Projects

COMPLETED OR INACTIVE PROJECTS

The directors of the following projects report that they are no longer engaged in the production of materials. For information about them consult previous Clearinghouse Reports or contact persons listed below:

1. a. PROJECT TITLE: CHEMICAL BOND APPROACH PROJECT (CBA).
   b. CONTACT: Dr. Laurence E. Strong, CBA, Earlham College, Richmond, Indiana 47375.

2. a. PROJECT TITLE: ELEMENTARY SCHOOL SCIENCE PROJECT (ESSP-USU).
   b. CONTACT: Dr. John K. Wood, ESSP-USU, Physics Department, Utah State University, Logan, Utah 84321.

3. a. PROJECT TITLE: ELEMENTARY SCIENCE ADVISORY CENTER.
   b. CONTACT: Jane P. Richtmyer, Elementary Science Advisory Center, Ketchum 306, University of Colorado, Boulder, Colorado 80302.

4. a. PROJECT TITLE: THE NORDIC COMMITTEE FOR THE MODERNIZING OF SCHOOL MATHEMATICS.
   b. CONTACT: Dr. Lennart Sandgren, The Nordic Committee for the Modernizing of School Mathematics, Department of Education, Stockholm 2, Sweden.

5. a. PROJECT TITLE: THE NUFFIELD JUNIOR SCIENCE TEACHING PROJECT.
   b. CONTACT: Mr. E.R. Wastnedge, Nuffield Junior Science Project, 84 Cleveland Avenue, Darlington, Co Durham, England. Tel. Darlington 6-6655.

6. a. PROJECT TITLE: NUFFIELD O-LEVEL BIOLOGY.
   b. CONTACT: W.H. Dowdeswell, Nuffield O-Level Biology, Winchester College, Hampshire, Winchester, England. Tel. Winchester 4584.

7. a. PROJECT TITLE: PHYSICAL SCIENCE STUDY COMMITTEE PHYSICS (PSSC).
   b. CONTACT: Miss G. Kline, PSSC, Education Development Center, 55 Chapel Street, Newton, Massachusetts 02160.

8. a. PROJECT TITLE: PORTLAND PROJECT--INTEGRATION OF CHEMISTRY AND PHYSICS FOR SECONDARY SCHOOLS.
   b. CONTACT: Dr. Michael Fiasca, Portland Project, Portland State College, P.O. Box 751, Portland, Oregon 97207. Tel. 503-226-7271. Ext. 291.

9. a. PROJECT TITLE: PROGRAM FOR PRE-COLLEGE CENTERS, CURRICULUM RESOURCES GROUP (CRG).
   b. CONTACT: Mrs. Emily Morrison, CRG, Institute for Services to Education, 55 Chapel Street, Newton, Massachusetts 02160. Tel. 617-969-4615.

10. a. PROJECT TITLE: SCHOOL SCIENCE CURRICULUM PROJECT (SSCP).
    b. CONTACT: Richard F.P. Salinger, SSCP, 1102 West Main Street, University of Illinois, Urbana, Illinois 61801.

11. a. PROJECT TITLE: STUDY OF A QUANTITATIVE APPROACH IN ELEMENTARY SCIENCE.

b. CONTACT: Dr. Clifford E. Swartz, Study of a Quantitative Approach in Elementary Science, Physics Department, State University of New York, Stony Brook, N.Y.

1968 Questionnaires Not Received as of April 1, 1968

1968 QUESTIONNAIRES NOT RECEIVED AS OF APRIL 1, 1968 (INTERNATIONAL)

The following projects are or have been active in the area of curriculum development. As of our publication date, replies from these project directors had not been received at the Clearinghouse. For further information see previous Clearinghouse reports or address inquiries to the addresses below:

AFRICA:

SCHOOL MATHEMATICS PROJECT OF EAST AFRICA (SMPEA).

CONTACT: T.D. Morris, School Mathematics Project of East Africa, P.O. Box 5881, Nairobi, Kenya. Tel. Nairobi 24843.

UNESCO PILOT PROJECT ON NEW APPROACHES AND TECHNIQUES IN BIOLOGY TEACHING IN AFRICA.

CONTACT: Mrs. Anne Hunwald, UNESCO, Division of Science Teaching, Department of Advancement of Science, Place Fontenoy, Paris 7, France.

ARGENTINA:

DEPARTMENT OF EDUCATIONAL TELEVISION.

CONTACT: J. Manuel Calvelo Rios, Faculty of Exact and Natural Sciences, Peru 272, Buenos Aires, Argentina.

AUSTRALIA:

EDUCATION DEPARTMENT OF VICTORIA TECHNICAL SCHOOLS' SCIENCE COURSES, FORMS 1-4.

CONTACT: R.A. Armitage, Technical Schools' Branch, Education Department of Victoria, Treasury Place, Melbourne, C. 2, Australia.

VICTORIA DEPARTMENT OF EDUCATION SCIENCE CURRICULUM PROJECT.

CONTACT: R.W. Cowban, Curriculum Officer, Curriculum and Research Branch, Education Department, 107 Russell Street, Melbourne, C. I. Victoria, Australia.

VICTORIA MATRICULATION CHEMISTRY.

CONTACT: A.S. Buchanan, Head, Department of Chemistry, University of Melbourne, Melbourne, Australia.

BRAZIL:

CENTRO DE ENSINO DE CIENCIAS DE BAHIA (CECIBA).

CONTACT: Jose Walter Bautista Vidal, Rua Aristides Novis, 2, Escola Politecnica, 8° andar, Salvador, Bahia, Brasil.

CANADA:

NATURAL SCIENCE PROGRAM IN GENERAL EDUCATION.

CONTACT: C. Brian Cragg, Coordinator, York University, 4000 Keele Street, Toronto, Ontario, Canada.

CEYLON:

CAAS SCHOOL BIOLOGY PROJECT.

CONTACT: V. Basnayake, Ceylon Association for the Advancement of Science, 55 Torrington Square, Colombo 7, Ceylon.

CEYLON (Continued):

For each of the following projects, CONTACT: Mr. B.J.P. Alles, Deputy Director General, Secondary Education Branch, Ministry of Education, Malay Street, Colombo 2, Ceylon. Tel. 79552.

BIOLOGY CURRICULUM DEVELOPMENT PROJECT.

CHEMISTRY, CURRICULUM DEVELOPMENT PROJECT.

EVALUATION RESEARCH PROJECT.

GENERAL SCIENCE CURRICULUM DEVELOPMENT PROJECT.

MATHEMATICS CURRICULUM DEVELOPMENT PROJECT.

PHYSICS, CURRICULUM DEVELOPMENT PROJECT.

CHILE:

PROGRAMA DE PROFECCIEMENTO.

CONTACT: Hector Croxatto, Coordinator, 439 Castro, Santiago, Chile.

COLOMBIA:

PRODUCTION OF BSCS MATERIALS TRANSLATED AND ADAPTED TO THE TROPICAL ENVIRONMENT.

CONTACT: Humberto Gomez, Universidad de Antioquia, Medellin, Colombia, S.A.

CZECHOSLOVAKIA:

CENTER FOR MODERNIZATION OF MATHEMATICS AND PHYSICS TEACHING.

CONTACT: Miloslav Valouch, Professor of Physics, Faculty of Mathematics and Physics of the Carles University, Ke Karlovu 3, Praha 1, Czechoslovakia.

FRANCE:

AMERICAN SCHOOL OF PARIS PHYSICAL SCIENCE COURSE.

CONTACT: David A. Sousa, American School of Paris, 8 rue de la Machine, 78 - Louveciennes, France.

GERMANY:

INSTITUT FUR BILDUNGSFORSCHUNG IN DER MAX-PLANCK-GESELLSCHAFT.

CONTACT: Dr. Doris Knab, Max-Planck-Gesellschaft, Blissestr 2. 1 Berlin 31, Germany.

HUNGARY:

CURRICULUM PROJECT FOR SPECIAL CLASSES IN CHEMISTRY AND PHYSICS (BIOLOGY), SECONDARY SCHOOL, FOURTH GRADE.

CONTACT: Karoly Garami, National Institute of Pedagogy, 17 Gorkij fasor, Budapest VII, Hungary.

OPI MATHEMATICAL REFORM PROJECT.

CONTACT: T. Varga, National Institute of Pedagogy, Chair of Mathematics, Budapest VII, Gorkij fasor 17-21, Hungary.

ITALY:

PROJECT FOR A MODERN TEACHING OF CHEMISTRY IN SECONDARY SCHOOLS.

CONTACT: Arnaldo Liberti, Head, Analytical Department, School of Chemistry, University of Naples, Naples, Italy.

ITALY (Continued):

PROJECT FOR A MODERN TEACHING OF MATHEMATICS IN SECONDARY SCHOOLS.

CONTACT: Prof. Mario Villa, Ord. Prof. and Director of Institute of Geometry of University of Bologna, Italy.

PSSC PILOT EXPERIMENT.

CONTACT: G. Puppi, Instituto di Fisica dell'Universita, Via Irnerio, 46 - Bologna, Italy. Tel. 260991.

JAMAICA:

PHYSICS AND MATHEMATICS CENTRE.

CONTACT: Keith W. Warren, Physics and Mathematics Centre, University of the West Indies, Kingston, Jamaica.

JAPAN:

ADAPTATION OF BSCS HIGH SCHOOL MATERIALS INTO JAPANESE.

CONTACT: Yosita Sinoto, c/o Department of Biology, International Christian University, Mitaka, Tokyo, Japan.

GENERAL CHEMISTRY COURSE PLAN BASED ON CONCEPTS OF ENERGY AND STRUCTURE.

CONTACT: Bun-ichi Tamamushi, Tokyo Joshi Daigaku (Tokyo Woman's Christian College), Zempukuji 2, Suginamiku, Tokyo, Japan.

KOREA:

ELEMENTARY SCIENCE TEXTBOOK EDITING PROJECT.

CONTACT: Choi Yung Bok, Chief Editor of Textbook Bureau, Bureau of Textbooks, Ministry of Education, Seoul, Korea.

NEW SCIENCE CURRICULUM STUDY PROJECT.

CONTACT: Chung Yun Tai, Chairman of SESC, College of Education, Seoul National University, Seoul, Korea.

PAKISTAN:

WEST PAKISTAN EDUCATIONAL EQUIPMENT TECHNICAL ASSISTANCE CENTER.

CONTACT: Mr. S. Naseem Ahmed, West Pakistan Educational Equipment Technical Assistance Center, Gulberg III, Lahore, West Pakistan.

PAPUA AND NEW GUINEA:

DEPARTMENT OF EDUCATION, TERRITORY OF PAPUA NEW GUINEA SECONDARY SCHOOLS MATHEMATICS COURSE, FORMS 1-4.

CONTACT: K.C. Lovitt, Secondary Division, Department of Education, Konedobu, P.N.G.

PERU:

INSTITUTO PARA LA PROMOCION DE LA ENSENANZA DE LAS MATEMATICAS.

CONTACT: Jose Tola, Universidad Nacional de Ingenieria, Apartado 4153, Lima, Peru. Tel. 7-0297.

PORTUGAL:

MODERNIZATION OF THE TEACHING OF MATHEMATICS IN SECONDARY SCHOOLS.

CONTACT: Jose Sebastiao e Silva, Avenida Infante Santo, 68, F°., E - Lisboa 3, Portugal.

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SCANDINAVIA:

THE SPECIAL PROJECT STP-5/SP SCANDINAVIA FOR PILOT COURSES IN CHEMISTRY.

CONTACT: Gustaf Ahman, The National Board of Education, Fack, Stockholm 22, Sweden.

TURKEY:

MOBILE UNITS FOR SCIENCE TEACHING.

CONTACT: Rauf Nasuhoglu, General Directorate of Educational Aids and Technical Cooperation, Ministry of Education, Ankara, Turkey.

UNESCO:

PILOT PROJECT FOR THE IMPROVEMENT OF MATHEMATICS TEACHING IN THE ARAB STATES.

CONTACT: Science Teaching Division, UNESCO, Place de Fontenoy, Paris 7e, France.

PILOT PROJECT ON NEW APPROACHES AND TECHNIQUES OF BIOLOGY TEACHING IN AFRICA.

CONTACT: Mme. Anne Hunwald, UNESCO Pilot Biology Project, Science Teaching Division, UNESCO, Place de Fontenoy, Paris 7e, France.

1968 QUESTIONNAIRES NOT RECEIVED AS OF APRIL 1, 1968 (NATIONAL)

The following projects are or have been active in the area of curriculum development. As of our publication date, replies from these project directors had not been received at the Clearinghouse. For further information see previous Clearinghouse reports or address inquiries to the addresses below:

INDIVIDUALLY PRESCRIBED MATHEMATICS INSTRUCTION (IPI Math).
CONTACT: Henry Cohen, Learning Research & Development Center, 160 N. Craig St., University of Pittsburgh, Pittsburgh, Penn. 15213. Tel. 412-683-8640.

K-12 SCIENCE DESIGN.
CONTACT: Mr. J. Paul Taylor, Elementary Curriculum Coordinator, Las Cruces School District No. 2, 301 West Amador Ave., Las Cruces, New Mexico 88001. Tel. 524-2894.

OAKLEAF INDIVIDUALIZED ELEMENTARY SCHOOL SCIENCE.
CONTACT: Warren Stepler, Learning Research and Development Center, 160 N. Craig St., University of Pittsburgh, Pittsburgh, Pa. 15213. Tel. 412-683-8640.

PENNSYLVANIA RETRIEVAL OF INFORMATION IN MATHEMATICS EDUCATION SYSTEM (PRIMES).
CONTACT: Emanuel Berger, Bureau of Research Administration and Coordination; Doris E. Creswell, Bureau of General and Academic, Education, Department of Public Instruction, Box 911, Harrisburg, Pa. 17126. Tel. 717-787-6016.

PONCE CURRICULUM CENTER - PRODUCTION AND TRANSLATION OF SCIENCE AND MATHEMATICS MATERIALS.
CONTACT: Mrs. Josefina S. Oliver, Box 1125, Ponce, P. R. 00732. Tel. 842-8052.

REORGANIZED SCIENCE CURRICULUM, K-12, MINNEAPOLIS PUBLIC SCHOOLS.
CONTACT: Dr. J. Hervey Shutts, 807 N.E. Broadway, Minneapolis, Minnesota 55413. Tel. 612-332-4284, ext 344 or 345.